

MINING WORLD



MARCH 1956 Vol. 18 No. 3

Labor Cost: A True
Metal Price Gauge

Why U.S. Mining
Needs An Import Tax



U₃O₈ Miners Mechanize To Fit The Ore
Pages 36 and 40

50 cents a copy—3s 6d in sterling

**ONE
DEAD
CELL**

but this

WEMCO Fagergren
still produces



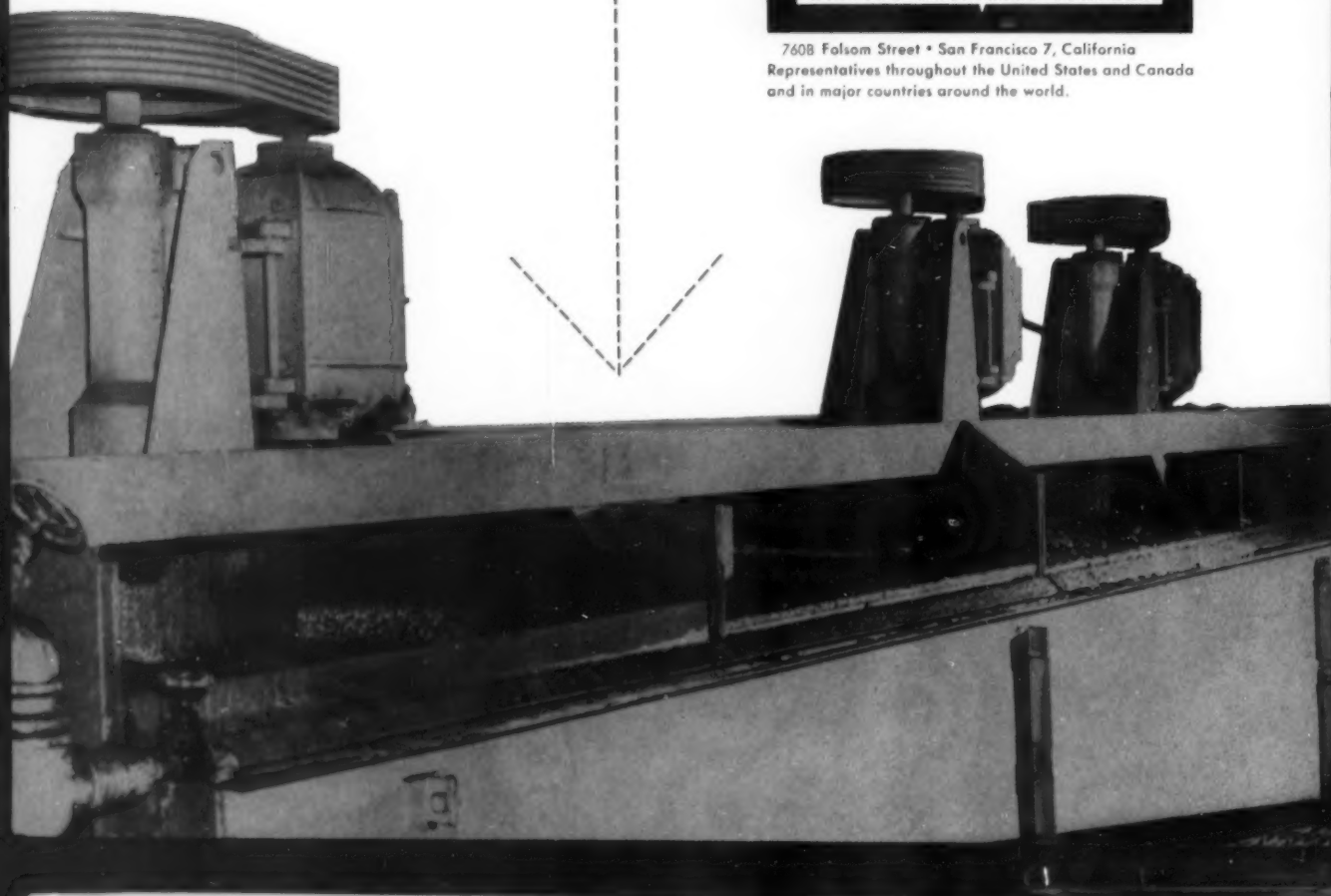
There is no down time when a Wemco Fagergren mechanism is lifted out for service. The bank of cells continues to produce without interruption. Sanding up of the inactive cell is no problem. When the serviced unit (or a spare) is returned, it simply digs its way back into position.

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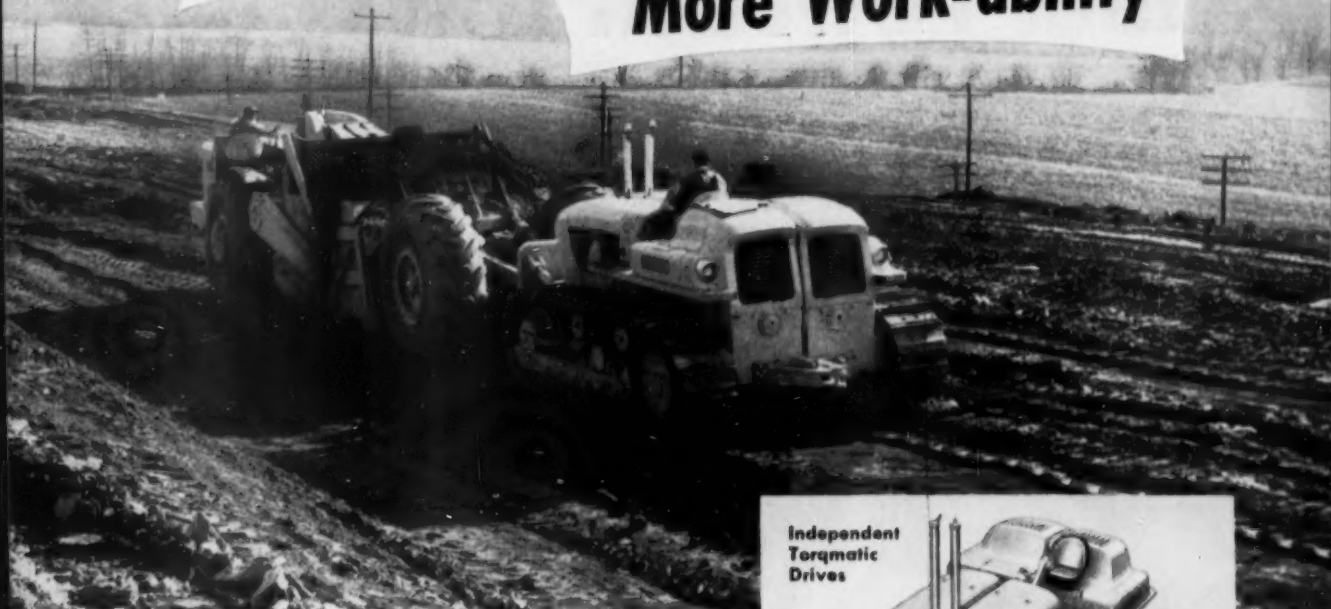


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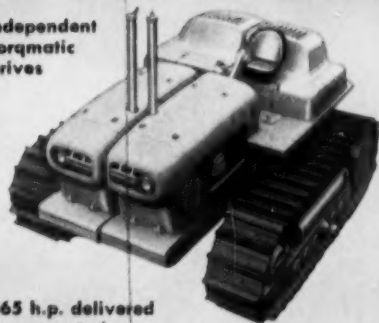
with the "Euc" TC-12 Twin Crawler Tractor

Here's a completely new concept of tractor design and performance... the TC-12 Twin-Power Euclid. It's designed and built to deliver more power, easy operation and greater work-ability—plus exceptionally fine accessibility for servicing. Power train components are matched and job proved with years of dependable performance in heavy earth moving equipment.

Powered by two 194 h.p. engines with separate Torq-matic Drives, the TC-12 gives a smooth, steady flow of power to meet every job requirement. There's no master clutch and no manual gear shifting. Three speed ranges in forward and reverse are available by simply moving a selector lever... top travel speed is 8.3 m.p.h. The TC-12 has good stability and traction on rough ground because each half of the tractor is separate and free to oscillate... the two halves can be easily separated for shipment. Write for detailed specifications.

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to power train



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FOR MOVING EARTH, ROCK, COAL AND ORE



HOW TO GET

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Installed as original power in this $\frac{3}{4}$ -yd. Lorain shovel, a CAT® D4600 Diesel Engine has racked up more than 8700 profitable hours for Glenwood Mining Co., Inc., Glenwood, Ala. The unit stays steadily on the job, digging and loading about 175 tons of brown iron ore per 10-hour day, $5\frac{1}{2}$ days a week, the year around. I. D. Gibson, company president, says, "This Cat Engine has plenty of power, even in hard digging."

Excellent though this engine's performance is, the new line of Caterpillar Diesels will deliver even more power with less down time at lower cost. The Cat D318, for example, is ideal for installation in shovels like the one shown here.

Like all Caterpillar Engines, the 4-cycle D318 is compact for easy installation. It is also available with torque converter for smooth power application and ease of operation. It idles without fouling, and runs cleanly and efficiently even on low-cost No. 2 furnace oil, thanks to its tinker-free Caterpillar fuel injection system. And it owes its trouble-free work life to such quality features as

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Leading manufacturers can supply Caterpillar Engines as original power in their equipment. And your Caterpillar Dealer can install one of these rugged 4-cycle diesels when it's time to repower your present equipment. He will gladly advise you on the engine from the broad Caterpillar line that will suit all your mining operations. Count on him, too, for skilled service and factory parts you can trust. Why not give him a call today?

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**MODERN
HEAVY-DUTY POWER**

Mining World

Including the Export Edition WORLD MINING

Published monthly except in April when publication is semi-monthly

VOLUME 18

MARCH 1956

No. 3

OPERATIONS—TECHNOLOGY

Underground Mining

Standard Uranium Mechanizes With Gismos By Stanley H. Dayton, Associate Editor	36
Four Corners Leases Small Uranium Deposits	40

Open Pit Mining

Dirt Flies at New Borax and Copper Pits	44
---	----

Industry Economics

Labor Hours: A True Metal Price Gauge By Frank G. Breyer	46
Can An Import Tax Solve U. S. Mining Problems? By Andrew Fletcher	49

Conventions

Colorado Mining Association's Pace-Setter Meeting	52
---	----

IN THE NEWS

International	65	Central-Eastern	91	Northwest	93
Rocky Mt.	87	Iron Ranges	92	Southwest	96

DEPARTMENTS

Grab Samples	4	International Newsmakers	59
Drifts and Crosscuts	29	Fission Facts	63
Capital Concentrates	31	Production Equipment Preview	85
U. S. Personalities	57	Advertisers Index	102

COVER map shows where Four Corner Uranium Corporation, a typical small mine operation; and Standard Uranium Corporation, a typical large mine operation are producing uranium on the Colorado Plateau.

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mining



foods

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**GRAB SAMPLES
From the Mail**

Minerals Attache Recommends

Dear Sir:

The United States Minerals Attache at the U. S. Consulate in Johannesburg has shown us your "Possible Markets for Ores and Metals" (Ore Buyers' Guide in the MINING WORLD Yearbook). We found it very interesting and we would appreciate it if you could kindly let us have a copy, and if there is any charge we are prepared to pay same.

W. ZYLINSKI
Managing Director
W. Z. Industries (Pty.) Ltd.
Johannesburg, Union of South Africa

Studies WM for Examination

Dear Sir:

I look forward to receiving my copy of **WORLD MINING** because it has been instrumental in my receiving quite a few publications from commercial organizations in the United States dealing with specialized mining equipment and machinery.

At the present time I am preparing for the examination of mine managers in Australia, and your publication acquaints me with quite a lot that is current overseas in mining and mechanization and mining trends and practices.

WORLD MINING in this and many other respects is to be highly commended. In fact, I know that it is read with interest by several others in this district.

S. C. THOMAS
Vatukaula
Vitilevu
Fiji Islands

An Extremely Valuable Summary

Dear Sir:

I would like to say that I appreciate **WORLD MINING**. It is an extremely valuable summary of mining and metallurgical affairs.

I wish to advise you that I have accepted the position of assistant alumina superintendent with the Australian Aluminum Production Commission, with headquarters at Bell Bay, Tasmania. Please address future copies to me at my new address.

ALLEN J. GITTO
Broken Hill Associated
Smelters Pty. Ltd.
Port Pirie, South Australia

Important and Prominent Men

Dear Sir:

WORLD MINING has been much appreciated by me, especially for the mining and exploring data. The Yearbook issue is very interesting and practical. From it I learned that the mining of magnesite in Greece, which formerly was of some importance, does not account very much today.

At your suggestion I have asked some important and prominent mining men, even the Director of the Geological Bureau of the Mines in the Netherlands if he receives your magazine. However, I understand that he already receives it.

B. F. P. ROMAS
Heerlin, Netherlands

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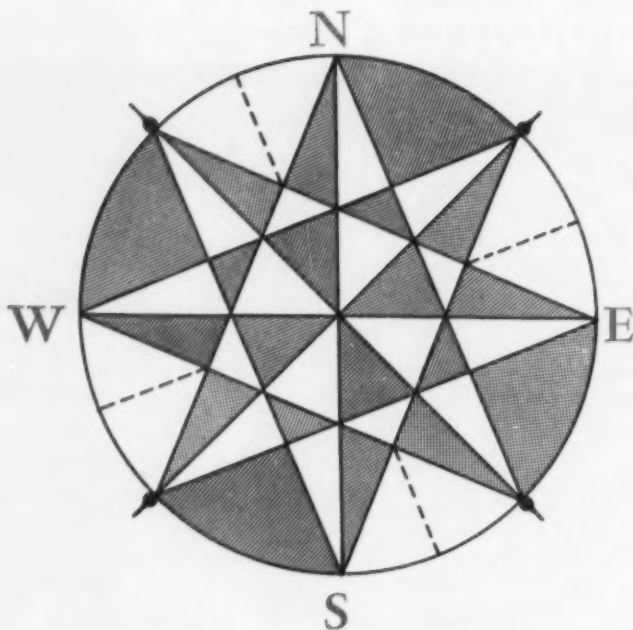
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ON THE GO...

ALL OVER THE WORLD

Due to progressive metallurgical technology in using modern methods of specific gravity, high tension, and magnetic separation, Carpco systems are now in use for tin, titanium, tungsten, zirconium, thorium, uranium, and many other minerals and metals.

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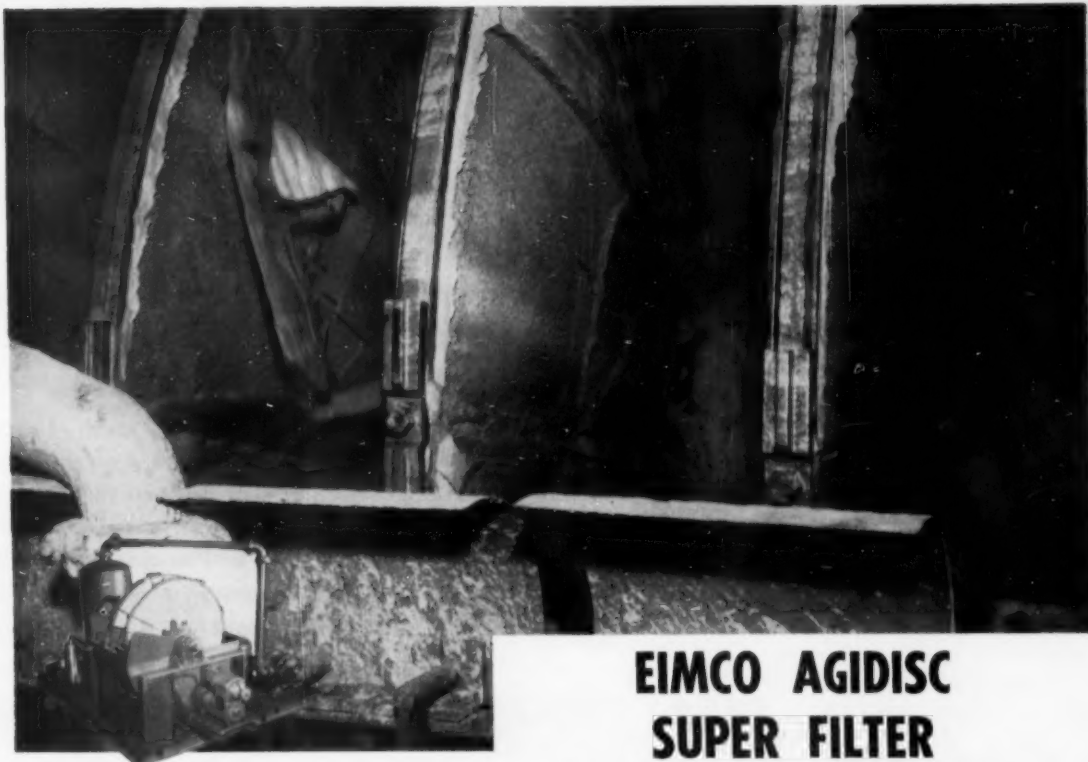
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A—Platform Type

EIMCO AGIDISC SUPER FILTER for Metallurgical Slurries

Eimco Agidisc filters are, by far, the most popular filters in Metallurgical operations today.

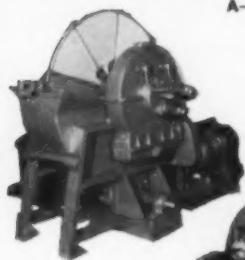
There's a reason—that justifies this preference! Agidisc filters do a better job for less money.

Here are some of the advantages:

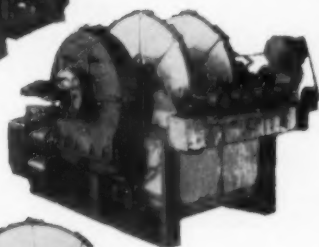
1. Agidisc Filters give a clean cake discharge.
2. They eliminate messy "build-up" of cake on bag clamps.
3. Eimco Agidisc Filters provide an even distribution of evenly dispersed grain size material over the entire disc surface. This uniformity in thickness provides for greater tonnage, better drying and faster dewatering.

Numerous installations on dewatering of Metallurgical concentrates show Eimco Agidiscs improve tonnage capacity by as much as 22% and give an overall reduction of moisture content in cake by as much as 2% as compared with ordinary filters.

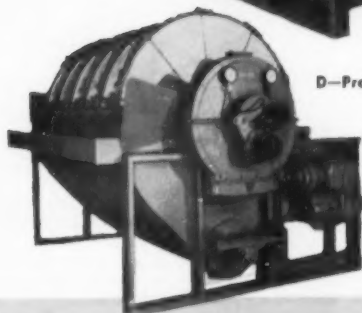
Let us show you an Eimco Agidisc in operation.



B—Test Model Agidisc



C—Special Disc



D—Production Size Agidisc

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AKINS

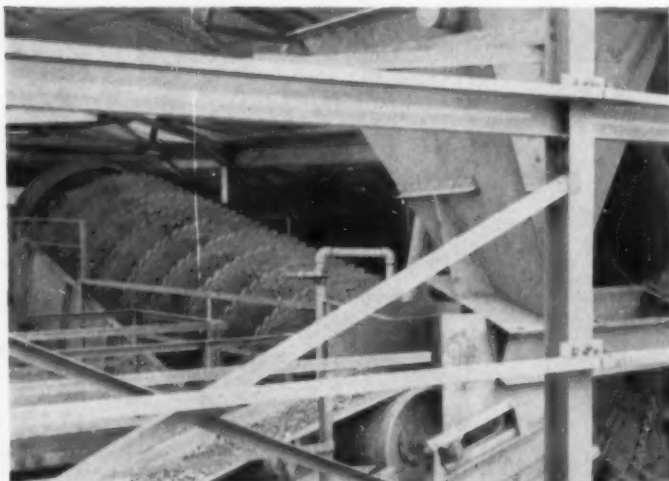
1st in EXPERIENCE with Spiral Separators for Heavy Media

1908...the first Akins. Colorado Iron Works made the first Akins Spiral Classifier in 1908. Its outstanding success led to many profitable applications and to Akins' leadership in the field of classification.

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...1956

This 84" Akins Separator, installed in 1952, is typical of the many successful installations on iron ore. This unit's performance during its first year of operation resulted in the company purchasing a duplicate Separator for another of its plants. These Separators are achieving outstanding results, improving both grade and recovery through extraction of middlings...taking advantage of Akins' exclusive ability to make a 3-product separation in one machine, requiring only one media circuit.



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- 3-product separation in one machine, requiring only one media circuit.
- Start-up under full load.
- Entire vessel is visible and accessible.
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- Gradation of gravity and viscosity from feed entry point to sink removal point provides natural cleaning of sink, and allows circulation of media at lower gravity and viscosity.

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Akins — the ORIGINAL spiral type classifier.

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MINE USES

for self-powered scrapers

Read the following list of mine-scraper-applications, developed from an editorial published recently by *Mechanization Magazine* . . . analyze these scraper economies for your open pits

1 In auxiliary stripping, where overburden is so thick that the wash or earth must be removed to allow boom-type equipment to work within its economical limits.

2 Where spoil room for boom-tool operations is inadequate; where outcrop is bothered by property lines, highways, railroads, pipe lines, power lines and undivertable streams.



Rigs make 180° turns, in less than machine's length, operate in tight quarters as shown above. Tournapulls keep working in tough going when other self-powered scrapers bog down. When one wheel slips, exclusive power-transfer differential automatically transfers power to wheel on firmest footing. Positive geared steer on kingpin pivots prime-mover from side to side, "walking" drive wheels to fresh footing.



3 Widening a bench at the side of the pit to provide greater casting area for shovel or dragline.

4 Stripping wet top-layers of earth, which might slough and cause slides into a shovel cut.

5 Cutting the initial box-cut, depositing the spoil out-of-the-way of later dragline operations.

6 Stripping or mining small or isolated veins that do not warrant the expense of moving large excavating equipment to the site.

7 Stripping hillside and hilltop operations...self-powered scrapers particularly adapted for this type of work.

8 Cutting new beds for temporary or permanent stream diversions; building dams and settling ponds.

9 Building grades for railroads and for truck haul-roads.

10 Construction and maintenance of ditch and drainage systems.

11 Grading around mine buildings and mine location housing.

12 Land-fill disposal of refuse.

13 Stockpiling of coal . . . spreads in even layers, compacts while hauling.

14 Supplementary hauling of ore, coal, or overburden...open-top scrap-

ers may be self-loaded, push-loaded, or shovel-loaded. The 7½-yard "D" shown here hauls at speeds to 28 mph, unloads in seconds, makes complete turn in 26 feet. Simple electric controls and big 4-wheel air brakes permit rig to work safely at high speeds in tightly restricted quarters

er can be shovel-loaded and used as a truck-type hauler.

15 Mining lean ore, previously abandoned, in widely scattered or isolated areas.

16 Stripping overburden where level piling of spoil is required.

17 Stripping shallow overburden which does not justify expense of installing and operating major excavating equipment.

18 Leveling spoil piles for drainage, reforestation, farming, etc.

19 Removing and replacing top-soil for reclamation purposes.

If you have any of the above dirt-moving problems...write us or check with your nearest LeTourneau-Westinghouse Distributor. We'll be glad to have our experienced field engineers analyze your operation and propose suitable procedure and equipment for most economical handling. Our rubber-tired prime-mover-scraper combinations are available in three sizes: "D" . . . 138 hp . . . 7½ yards heaped capacity; "C" . . . 208 hp . . . 18 yards heaped capacity; BIG "B" . . . 293 hp . . . 25-yards heaped.

Tournapull—Trademark Reg. U.S. Pat. Off. G-1015-M-b



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



EIMCO KEEPS TOUGH EXCAVATION JOB ON SCHEDULE

Contractor — Montag-Halvorson - Cascade-Austin.

Location — The Dalles, Oregon.

Project — The Dalles Dam — Excavation of South Fishway.

Rock — lava basalt 91,000 cubic yards.

Report — Eimco's 105 Tractor Excavator was purchased for this job after several other types of equipment had been tried and proved either entirely unsatisfactory or incapable of maintaining the desired pace. The fishway (shown above) was excavated in lava basalt (typical of this section) with its characteristic flows and faults. Blasting in the faulted zone left many large blocky pieces of rock.

The method successfully used to excavate the shot rock from the 1500 foot long by 15 foot wide fishway channel which was 16' deep at one end and 60' deep at the other is as follows: A 6 yard rock ship was lowered by a crane and held in place by a Koehring Dumptor. It was loaded by the

Eimco and hoisted out. "This method proved to be the most satisfactory and economical. Both machines took a terrific beating to get this job done, but to this day no one has been able to suggest a better way of doing it."

When it comes to bidding on a tough job — here are a few factors to consider: (1) Cubic yards of tough rock loaded per hour given proper haulage equipment — the Eimco will handle on a comparable basis with boom type shovels 1½ to 2 times its bucket size. (2) Cost — compare the prices. (3) Maintenance — compare these costs on jobs similar to your own. (4) Versatility — The Eimco moves quickly, easily. (5) Labor — compare the productivity per man hour.

Yes! You too will find Eimco's best for the tough jobs.



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B-178



After drilling and blasting operations are finished, "C" Rear-Dump moves in to begin clean-up. Daily, the three machines move 1 "round" or 1000 tons of loose limestone. At this rate, tunnel advances about 12 lineal feet per day. In the confined underground tunnel, "exhaust scrubbers" (shown on this machine) made exhaust gas harmless.

Here's where maneuverability really pays off!

Recently the Riverside Cement Co., Los Angeles, California, began tough tunneling operations in their underground limestone quarry at Crestmore, California. Handling all hauling on this project are 3 C Tournapull Rear-Dumps.

Extremely cramped quarters, adverse grades, long hauls on narrow, winding roads, are major problems testing men and machines every day. However, the rugged "C" Rear-Dumps are doing an outstanding job on this rough assignment. Pictures on this page show how "C's" maneuverability pays off when meeting difficulties like these.



Working in extremely cramped quarters like this, big machines turned in dump position which moves rear wheels forward for extremely short wheel base. "C" in "dump position" (shown in this picture) can turn within 20' 8". Its 11' 4" height and 11' width gave ample clearance for the tunneling operation shown here.



Loaded in 6 to 7 passes of 1½-yard Marion shovel, Rear-Dumps averaged 18 tons of limestone per load. 10'4" overall width-of-bowl gives dipper a big "target", makes loading faster, and easier. Minimum spillage was a major advantage in the tunnel work. These "C's" have 18-ton capacity. The new model "C" has 22-ton capacity.



Floor of this tunnel has 10% adverse grades (7% on curves), making for heavy hauling in close quarters. Torque converters on units automatically balance power to load, make operation easier for operator, cut loss of momentum in shifting, prevent killing engine by inexperienced drivers. They also cut shocks in power train and reduce maintenance.



On the entire 6600' cycle, units had only 500' of level haul. The entire route was narrow and winding. Multiple disc air brakes, using 3,763 sq. in. of braking surface, made maneuvering easy...gave operator more confidence on narrow turns. Push button electric controls also contributed to ease of operation and safety.



At a touch of a switch by operator, hoist motor is activated. Body lifts quickly... 18-ton load is dumped easily and fast. Body swings below and behind rear wheels, preventing material from piling under unit. Front wheel drive gives operator control of unit at all times, even when dumping over edge of steep embankment like this.

Tournapull—Trademark Reg. U.S. Pat. Off. R-873-Q-b



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Here's
the drill
you need for
**LARGER,
LOWER-COST
BLASTHOLES**

Joy 60-BH Drill in operation in a large Southwest copper mine.



the **JOY 60-BH** Super Heavyweight Champion

For high-production open pit mining of copper, as illustrated above, large-diameter blastholes are a *must*! The way to drill those large-diameter holes economically—either in copper ore, or in any other open-pit mining or overburden removal job—is with the Joy 60-BH Super Heavyweight Champion. Here's why: because this Joy rotary drill excels in all three of the features which determine bit penetration:

ROTATION—Infinite variation of bit speeds, accurately controlled bit speeds, more power on bit rotation, and constant indication of bit speed and pressure by gauges.

BIT WEIGHT—The Joy hydraulic feed, using two 5-foot hydraulic cylinders, is the most efficient and dependable method of applying bit pressure. It is more accurately controlled and less hazardous than other methods.

CUTTINGS REMOVAL—Only Joy uses a heavy-duty, industrial-type, water-cooled air compressor to insure more dependable air supply required for efficient rotary-air blast drilling.

Other features include a self-aligning hydraulic automatic chuck, hydraulically raised and lowered derrick, and rod handling device.

The 60-BH, capable of drilling 9" to 12" diameter holes in even the hardest rock formations, is the largest in the outstanding line of Joy Champion "rotary-air blast" drills. Smaller models are the 58-BH Heavyweight for 7½" diameter holes, and the 56-BH Middleweight for 6¼" diameter holes. Let us quote on your requirements. Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Write for FREE Bulletin 35-g



Consult a Joy Engineer

For AIR COMPRESSORS, ROCK DRILLS, CORE DRILLS, HOISTS and SLUSHERS, MINE FANS and BLOWERS

WOW M5900-25

JOY

WORLD'S LARGEST BUILDER OF CORE DRILLS, ROTARY BLAST HOLE DRILLS AND MOTORIZED DRILL RIGS



2 Tournatractor-drawn scraper teams easily load from a borrow-pit that was once an old spoil-bank. One team push-loads the other to get good loads in the shifting sands.

Levees for Swift's open pit mining built with rubber-tired tractor-scrappers

Open pit phosphate mining is used at Swift and Company's Plant-Food Division project at Watson Mine, Bartow, Florida. Levee building is a vital part of this open pit operation. Swift has 2 Tournatractor-drawn scraper teams for this job.

In the open pit mining process, water is used under high pressure to form a slurry of the phosphate matrix in the pits. This solution is pumped to the plant where phosphates are removed — waste "slime" is pumped to settling ponds in mined-out pits at rate of 8,000 gallons per minute. This slime, or refuse, contains 10% solids, which settle in the ponds and permit recovery of the

water. The Tournatractor-drawn scraper teams build levees around these continuously-filling slime ponds. Here's how they work:

Rigs load loose sand

The rubber-tired machines load waste-dump sand, topsoil, or clay and spread it on the levee around the slime pond. This sand, which the units are loading, is very clean and loose... contains no binder.

Fast, versatile Tournatractor combines pulling and pushing duty in one operation as one Tournatractor-drawn scraper team push-loads the other in this tough-loading material. Rigs then travel over short and bumpy haul-roads to fill.

Rubber tires "float" over sand

With this loose, shifting, sandy terrain to work in, these rigs and their big, low-pressure tires find their job an easily overcome challenge. The low pressures let the tires "spread" to stay on top of the ground and "float" over the sand. This increased flotation, together with the special tread design, gives the tires a good grip in the sand to keep tractor from sinking into the loose footing.

4 wheels do work of 500 track parts

Lubrication time on a Tournatractor is much less than on a crawler because there are 4 wheels doing the work of 500 moving track parts that are exposed to the sand, dust, and grit. In sandy going, such as this, the crawler would require more frequent lubrication with a greater loss of working time. With Tournatractor, the power-train from engine to 4 rubber-tired wheels is completely enclosed. Result: power rides all the way on sealed anti-friction bearings. Lubricants stay clean while sand and other abrasives stay out!

Can you cut costs with a Tournatractor?

If you have a sand problem... or a place for a "traveling-man" tractor... or two or three crawlers tied down to part-time assignments only a mile or so apart... be sure to check with us for an estimate of possible savings. Whatever your pulling, pushing, or other tractor assignments may be, the high-speed, 208 hp Tournatractor will pitch in anywhere to do a fast, accurate job.

Tournatractor—Trademark Reg. U.S. Pat. Off. OT-919-M-b



After loading, Tournatractor pulls scraper with heaping load from old spoil-bank borrow-pit to waste-dump for building levee.



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

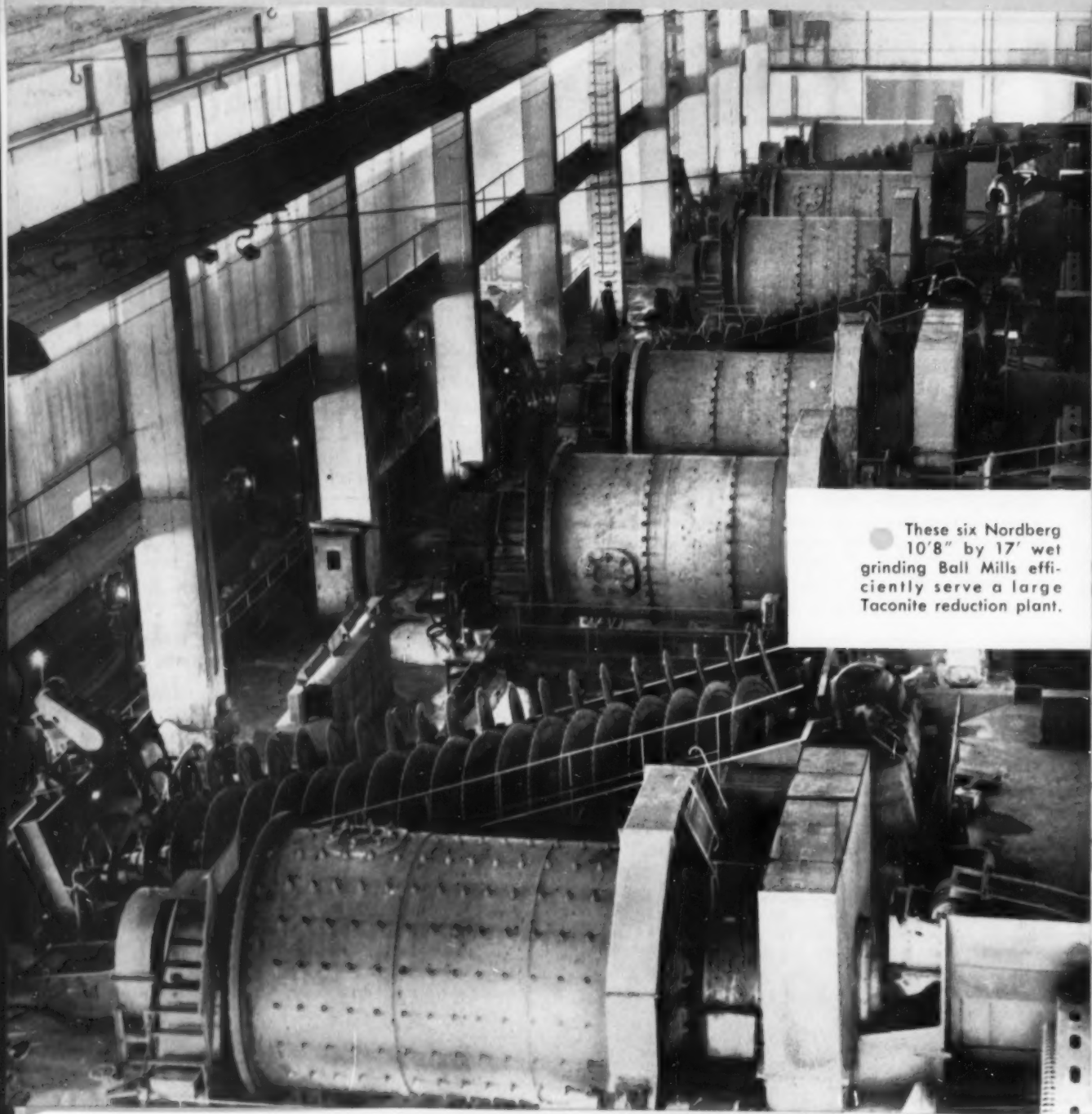


... from the ARCTIC to the EQUATOR

... from the FAR EAST to CONTINENTAL EUROPE

NORDBERG

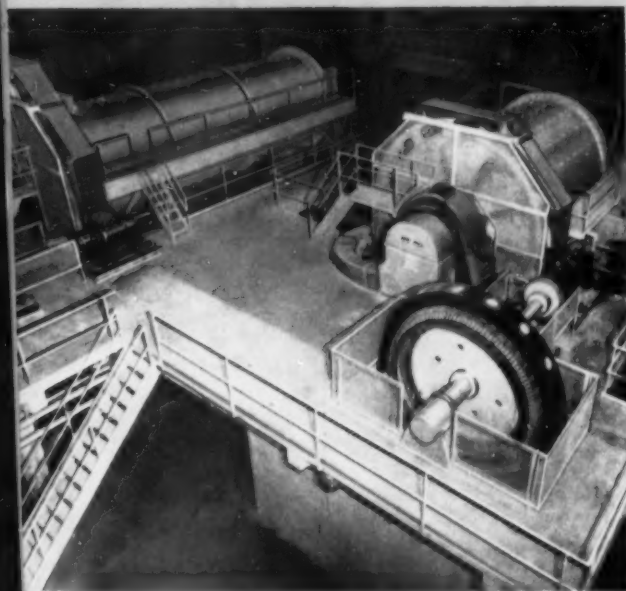
are Industries' choice for the efficient



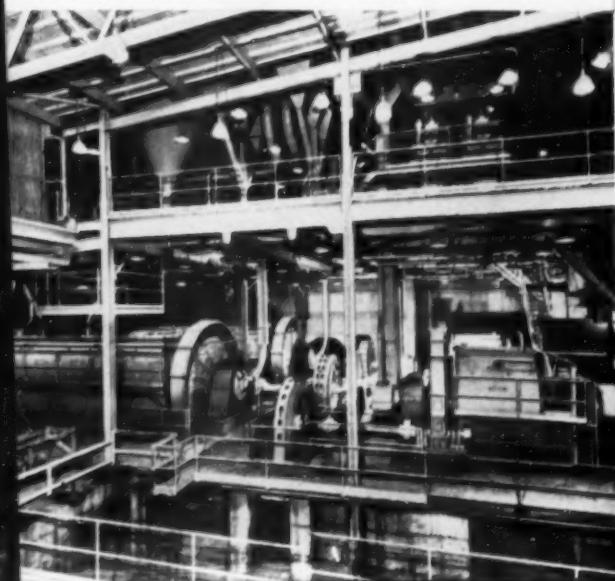
These six Nordberg
10'8" by 17' wet
grinding Ball Mills effi-
ciently serve a large
Taconite reduction plant.

GRINDING MILLS

reduction of ORES, CEMENT and MINERALS



These two views show eight Nordberg Grinding Mills used for raw and finish grinding in the plants of a leading cement producer. Above is a 10'8" by 16' Ball Mill and a 9'6" by 32' Compartment Mill. Below are two 10'8" by 17' and two 9'6" by 11' Ball Mills, together with two 8'6" by 36' Compartment Mills.



MORE than half a century of progressive engineering achievement, combined with quality production in modern manufacturing facilities, have won for Nordberg a foremost position in the field of heavy machinery manufacture.

This is evidenced by the universal acceptance which Nordberg Machinery has received by most of the Mining and Mineral processing industries throughout the world.

Typical of this heavy machinery is the complete line of Nordberg Grinding Mills for raw and finish grinding of cement materials, the fine reduction of metallic and non-metallic minerals and for numerous other processes where friable material must be comminuted to fine sizes.

Nordberg manufactures Ball, Tube, Rod and Compartment Mills, of grate, overflow and peripheral discharge types for wet or dry grinding service, in sizes ranging from 6 feet to 13 feet in diameter, and up to 50 feet in length.

For large or small operations, you can depend on Nordberg Machinery to deliver maximum output at lowest possible cost. Write for further information.
NORDBERG MFG. CO., Milwaukee, Wis.

SYMONS . . . a registered Nordberg trademark known throughout the world



SYMONS
GYRATORY CRUSHERS



SYMONS
CONE CRUSHERS



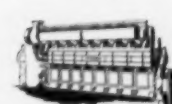
SYMONS VIBRATING
GRIZZLIES and SCREENS



SYMONS V-SCREENS



NORDBERG KILNS
and COOLERS



NORDBERG DIESELS—
10 to over 12,000 H.P.

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GM155



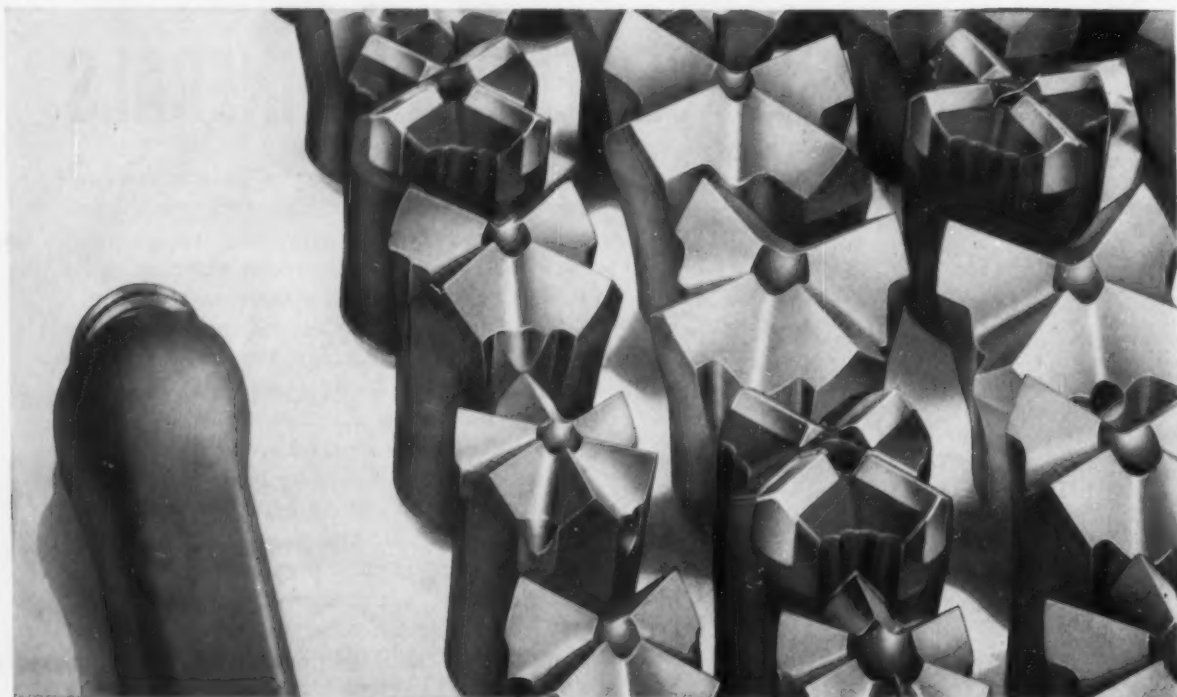
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TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG

SAVE DRILLING TIME— CUT STEEL INVENTORY



*TIMKEN® interchangeable rock bits let you
switch bit types without switching drill steels*

YOU can save valuable drilling time when changing ground calls for a change in bit type. Dozens of different Timken® rock bits—multi-use and carbide insert—fit the same drill steel ... can be changed quickly and easily, right on the job ... with no need to change drill steel. Simply screw one type off, screw the other right on the same drill steel. It takes but a minute.

This way your drillers will put more time into actual drilling. No time wasted changing steels when drilling conditions change. Production will go up, costs down. And with Timken rock bits there's no need to stock expensive double inventories of drill steel.

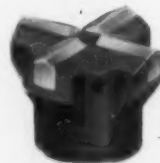
Both types of Timken rock bits—multi-use and carbide insert—give you two important advantages: 1) they are made from electric furnace Timken fine alloy steel. We're the only American rock bit manufacturer that takes this extra quality step. 2) a special shoulder union originated by the Timken Company keeps drilling impacts from damaging the threads.

When you consult Timken rock bit engineers, you get the benefit of over twenty years' experience in solving tough drilling problems. Why not give us a call with your next drilling problem? No obligation, of course. Call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be drilled.



WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant gauge holes, small diameter holes, very deep holes.

*... your best bet
for the best bit...
for every job*

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

BUILT FOR ROCK-HARD ROAD WORK

The Allis-Chalmers HD-21 is a Real Miner's Tractor

Chiseling an access road through rock demands "something extra" in crawler tractor performance and durability, yet it's the kind of job any miner's tractor may be required to do.

Conditions like this call for an Allis-Chalmers HD-21. Its 204-hp Allis-Chalmers engine is noted for its ability to perform with a minimum loss of efficiency even after thousands of hours of operation. Torque converter drive multiplies torque up to $4\frac{1}{2}$ times . . . develops 41,500 lb drawbar pull at low speeds

. . . cushions the entire power train against load shocks.

New Tru-Dimension tracks bring a new high in track durability. Thousand-hour lubrication intervals save maintenance time. Positive seals protect idler, support roller and truck wheel bearings from abrasive wear as no other seals can.

Ask your Allis-Chalmers dealer to show you the many other features that make the HD-21 a natural for rock-hard assignments.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION
MILWAUKEE 1, WISCONSIN



ALLIS-CHALMERS



CF&I ROCK BOLTS



make mine roofs and walls **SELF-SUPPORTING**

Conventional mine timbering is as old-fashioned as it is cumbersome, dangerous and expensive.

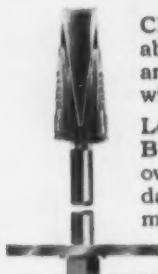
With CF&I Rock Bolts, there's no need for bulky timbers that require added transportation and installation, that restrict the efficient operation of machinery and limit miners' output. CF&I Rock Bolts are simply anchored in mine roofs and walls, and give secure support.

CF&I Rock Bolts offer these advantages:

- Reduce danger of roof falls due to blast effect**
- Provide valuable additional working space**
- Afford better ventilation**
- Are less bulky to store and haul**
- Low-cost installation**



SLOT & WEDGE TYPE



EXPANSION SHELL TYPE

CF&I Rock Bolts are available in slot and wedge type and expansion shell type with Pattin shell.

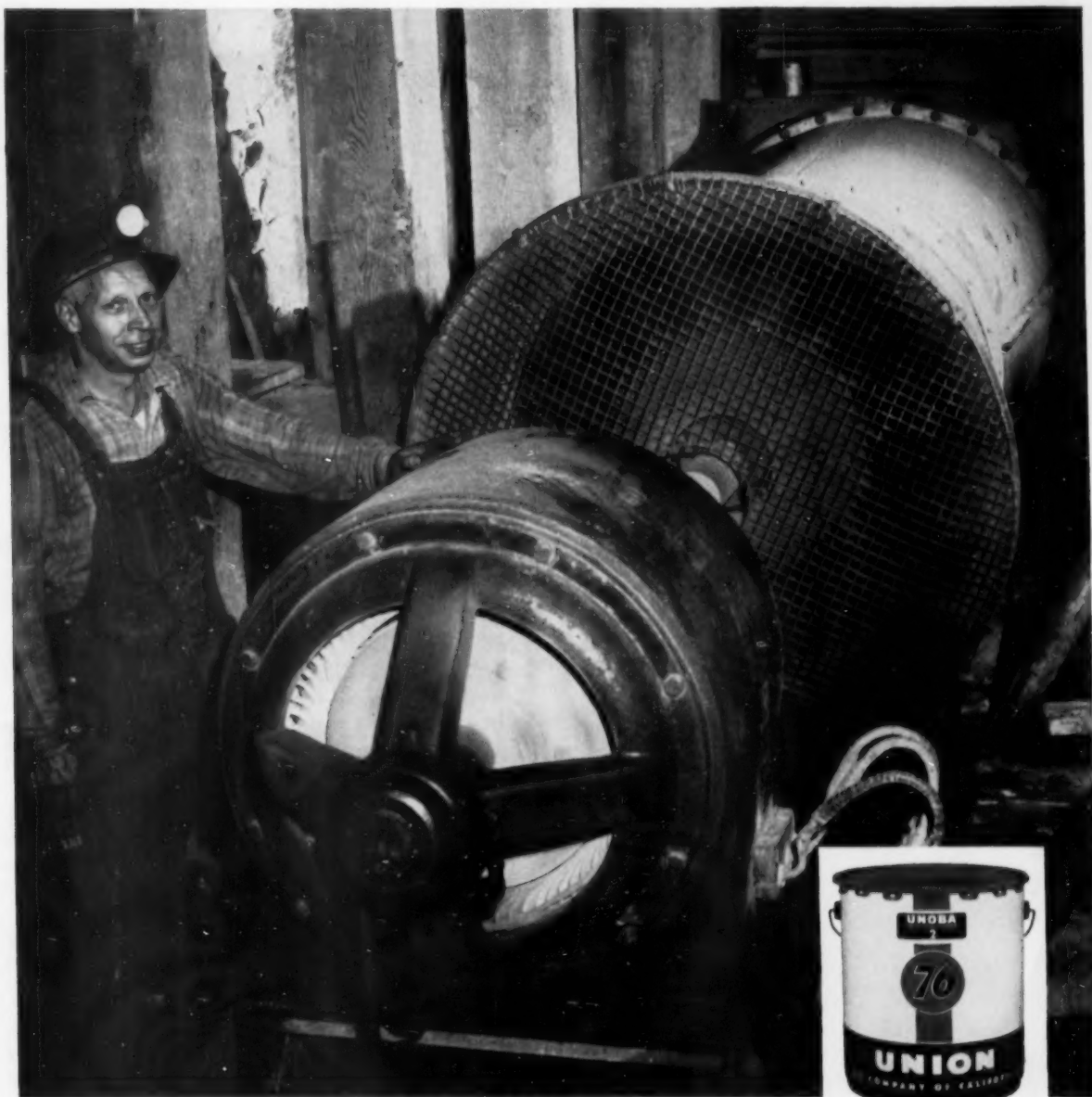
Learn how CF&I Rock Bolts can improve your own operations. Write today for descriptive information.

CF&I

ROCK BOLTS

CF&I STEEL PRODUCTS FOR THE MINING INDUSTRY

Grinding Balls • Grinding Rods • Wickwire Rope • Mine Rails and Accessories • Cal-Wic Industrial Screens



Leonard Anderson, underground electrician, Polaris Mining Co., Wallace, Idaho

"For general mine usage I recommend Union Oil products"

"Take Union's UNOBA Grease for example — we use this grease to protect the bearings in our main exhaust fan at the 3000' level. In spite of the heat and humidity, which is apparent, the bearings in this Joy fan driven by a 125-hp. G.E. motor have lasted more than three years ... far longer than could be expected using any ordinary grease."

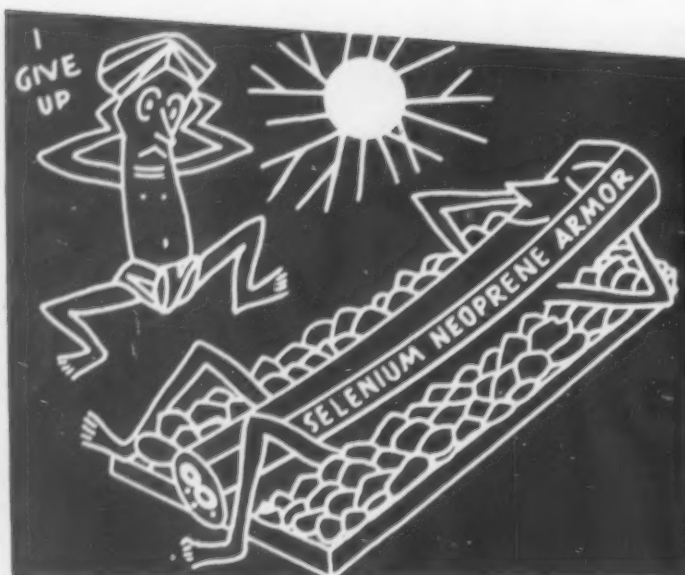
The photographer who took this shot agrees with Mr. Anderson about conditions at this fan. After bringing his cameras into this part of the mine, it took half an hour before they were free from condensation and could be used.

Any place in your mine where moisture is a problem is the place to use UNOBA Grease. Immediately available from your nearby Union Oil representative.



UNION OIL COMPANY
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • Philadelphia: Eastwick Ave. & Edgewood St.
Dallas: 313 Fidelity Union Life Bldg. • Kansas City, Mo.: 612 W. 47th St.
New Orleans: 644 National Bank of Commerce Bldg.



TOUGHER THAN TOUGH!

because it's **SELENIUM NEOPRENE**

The drawing above, amusing though it may be, is an accurate rendition of one of the problems that faces a cable attached to a drill. Strong sunlight tends to harden some cable jackets and make them brittle. Ultraviolet rays found in the sunlight help to cause cracks by forming ozone. These cracks are the point of entrance for moisture, dirt, water, and more sunlight. Eventually the cable breaks down from these causes.

This is not so with TIREX. Its cured-in-lead Selenium Neoprene Armor will continue to protect the insulated conductors regardless of the operating conditions, including strong summer sun. Samples of TIREX Selenium Neoprene Armor have been exposed to sunlight continuously for nearly twenty years and still show no signs of cracking.

TIREX was made to meet the problems encountered in mining. It was the first heavy-duty portable cord or cable made in this country. TIREX still leads the field by having the toughest, most abrasion-resistant jacket known. If you aren't using it now, why don't you get some and see how much more work you get per length of TIREX. Your local electrical supply house has TIREX in stock, or can get it for you quickly.

ONLY

Simplex

MAKES

SELENIUM NEOPRENE ARMORED

TIREX

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

Dart 140-TC truck with Allis-Chalmers 8DAS-1125 supercharged diesel being loaded by a shovel powered by an Allis-Chalmers 6DCS-1879 supercharged diesel.



Fifty-five ton Dart truck powered by Allis-Chalmers 8DAS-1125 supercharged diesel dumping over edge of spoil bank that is approximately 500 ft high.

DIESEL ENGINES AVERAGE 5,000 HOURS BEFORE OVERHAULS

Allis-Chalmers Buda Division truck engines powering 24 Dart and Euclid trucks help keep production flowing smoothly at the Bagdad Copper Corp. mine under extremely demanding conditions. These trucks work two shifts a day, six days a week, hauling out both overburden and ore. The haul covers about 7/10 mile, up a grade which starts at 12 percent and quickly increases to 18 percent, with five torturous switchback turns. Thick, abrasive dust adds still further to the grueling test.

Under these conditions the Allis-Chalmers engines have averaged over 5,000 hours of operation before their first overhaul. Many of them have given more than 20,000 hours of service since 1949, and are still "going strong."

Other Allis-Chalmers engines also take a hand in production even before the hauling stage. A large shovel powered by a Model 6DCS-1879 engine has loaded out more than seven million tons of ore since June, 1949. There are Allis-Chalmers engines on the drills, compressors and dozers.

Altogether, the performance of these big, tough engines has helped hold the over-all cost of moving ore and overburden to less than ten cents a ton. It will pay you to put productive performance like this under the hood of your trucks and other units. Write for complete details and the name of your nearest Buda Division dealer.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BC-1



Trucks at the Bagdad Copper Corp. mine, Bagdad, Arizona, haul overburden and ore up grades as steep as 18 percent and around five torturous switchbacks — a real test for any hauling unit and its engine.



The Engineer's Field Report

CASE HISTORY

Calol Vistac Oil
LUBRICANT

LOCATION *Utah*

Tough oil film protects mine roof bolters operating in water and heavy abrasive dust



WORKING CONSTANTLY in heavy abrasive dust, high humidity and water, these Joy roof bolters (above) eliminate crossbar timbering, for safety and increased production in one of Utah's largest coal mines. Lubricated exclusively with Calol Vistac Oil 28X since first put in service, these air tools drill holes, hammer bolts and tighten nuts on steel bearing plates. Bolts up to 8 feet long are rammed in to refusal at pressures up to 3,000 lbs. psi. The master mechanic for underground operations at the mine reports: "Calol Vistac Oil has proved completely satisfactory for this tough service. It continues to lubricate and protect these machines even under our most difficult dust and water conditions." Calol Vistac Oil is also used in all other air equipment in the mine.

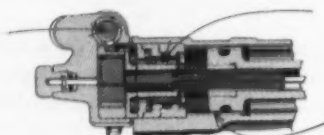
FREE CATALOG: "How to Save Money on Equipment Operation" will be sent on request to Standard Oil Company of California, 225 Bush Street, San Francisco.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your distributor, write or call any of the companies listed below.



TRADEMARK "CALOL", "VISTAC" REG. U. S. PAT. OFF.

Why CALOL Vistac Oil cuts costs in air-tool equipment



Atomizes quickly and completely—carries evenly over all parts. Prevents excessive fogging and has no unpleasant odor.

Additives help form tenacious, oily, pressure-resistant film in wet or dry conditions—cuts wear and power loss. Small quantity lubricates efficiently.

Resists high temperatures and oxidation. Stays fluid at low temperatures.

STANDARD OIL COMPANY OF CALIFORNIA THE CALIFORNIA COMPANY STANDARD OIL COMPANY OF TEXAS

225 Bush Street • San Francisco 20, California

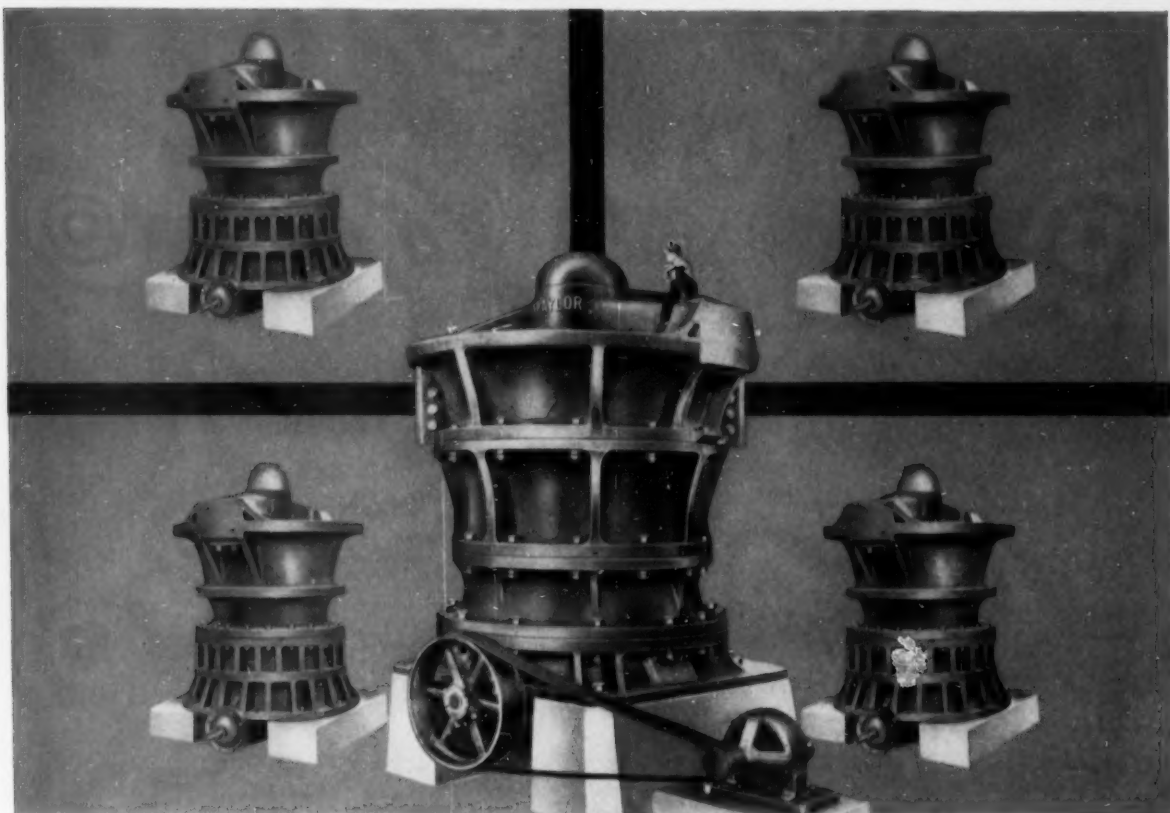
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TRAYLOR TC GYRATORY CRUSHERS

Promise Profits In Production of Taconite Ore at Aurora



TRAYLOR IS NOW BUILDING 5 for 1 Customer

Profitable production of iron ore from low-grade taconite calls for the most modern, efficient methods and equipment. That's why one customer alone ordered 5 Traylor TC Gyratory Crushers for the primary and secondary reduction of extremely hard Taconite-bearing rock at the company's Aurora Project.

The giant Primary Crusher, now being built by Traylor, has a 60" receiving opening and 120" diameter crushing head. The seventh of its kind to be built by Traylor, this TC Gyratory weighs more than 1,250,000 pounds and is higher than a three-story house. In a 15 hour day this TC will crush 66,000 long tons of rock. Chunks of ore the size

of a flat-top desk, dumped into the crusher at the rate of 4,400 long tons per hour, will be reduced to 12" material. Four 36" Traylor Gyratories will take the 12" ore from the primary crusher and reduce it to minus 5" in the secondary reduction.

For increased production and extra profits . . . follow the example of leaders in the mining industry who have selected Traylor equipment for its known efficiency and dependability.

Traylor Bulletin #126 contains complete specifications and description of the outstanding features of Traylor TC Gyratory Crushers . . . send for your Free Copy today.

TRAYLOR ENGINEERING & MFG. CO.

831 MILL ST., ALLENTOWN, PA.

SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfr: Canadian Vickers, Ltd., Montreal, P.Q.



PRIMARY GYRATORY CRUSHERS



ROTARY KILN



SECONDARY GYRATORY CRUSHERS



BALL MILL

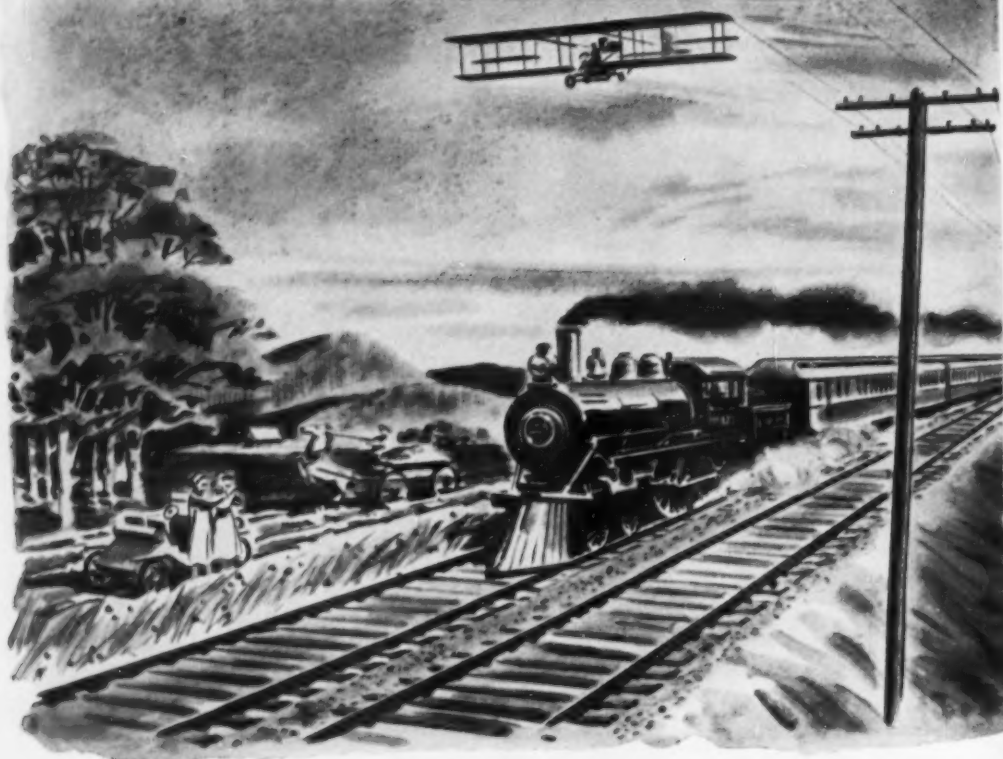


JAW CRUSHER



APRON FEEDER

1910 Our 46th Anniversary 1956



man on the wing

Great things were happening in aviation 45 years ago when we launched the idea of scientifically selected industrial diamonds and set up our little factory to make the diamond tools that were to be so vital to aviation.

Louis Bleriot had won \$5,000 offered by London Daily Mail for the first airplane flight across the English Channel. Piloting his 24 H.P., 450 pound monoplane to the dizzy height of 250 feet, he had spanned the 21 miles of open water in 37 minutes. The challenge echoed across the Atlantic and 1910 saw a brilliant parade of dramatic "firsts."

Glenn Curtis won \$10,000 offered by New York World in a 150 mile race with a train. Charlie Hamilton won \$10,000 offered by New York and Philadelphia newspapers for flying a round trip between those cities in one day. Walt Brookins won \$5,000 offered by Atlantic City Aero Club for reaching a height of one mile.

Ely took off from the deck of a cruiser and flew two miles to Norfolk in the first ship take-off flight. Phil Parmalee got \$5,000 for flying five bolts of silk from Dayton to Columbus, Ohio, in a store publicity stunt—the first merchandise shipped by air.

Another first in those early years was Engineered Diamond Tools followed, later, by Truco Engineered Diamond Bits containing the finest selected diamonds, hand set to bring each sharpest cutting face to the work. In virtually every major drilling operation in the world these bits are now famous for fast, accurate and dependable penetration in every formation and for their ability to reduce rig time and footage costs. May we send you a copy of the Truco Diamond Bit Catalog?

TRUCO DIAMOND BITS

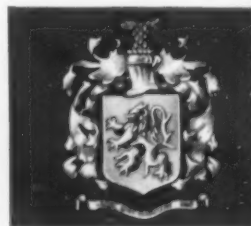
by

WHEEL TRUEING TOOL COMPANY

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WHEEL TRUEING TOOL CO. OF CANADA, LTD.

575 Langlais Avenue, Windsor, Ont., Canada



TRUCO CORING BIT



TRUCO CONCAVE
BLAST HOLE BIT



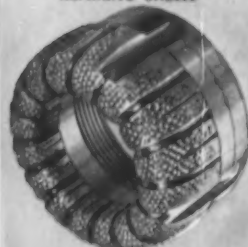
TRUCO PILOT BIT



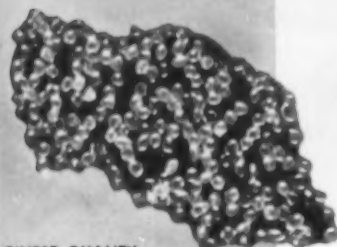
TRUCO IMPREGNATED
CORING BIT



TRUCO
REAMING SHELLS



TRUCO STANDARD
OIL FIELD BIT



PINEST QUALITY
DRILL BORTZ

In ore clean up buckets

DAVISON CHEMICAL CORPORATION

dries petroleum catalyst with a

STANDARD HERSEY
ROTARY DRYER



Intermediate Feed System makes Combination Dryer

The patented STANDARD-HERSEY intermediate-feed system makes the dryer used by Davison Chemical Corporation a combination flash and rotary dryer. This combination retains the most desirable characteristics of each.

Here is another example of the engineering skill developed by the 52 year old Standard Steel

Corporation. Thousands of successful dryer applications such as this give STANDARD-HERSEY an unsurpassed background to draw on in solving your drying problems. More than 30 different dryer types are available to fit any drying requirement. Contact STANDARD-HERSEY for the most profitable, most productive solution to your drying needs.

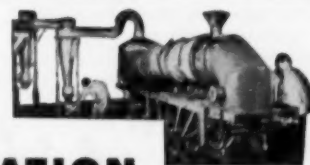
DP-4

SEND FOR FREE 12-PAGE ILLUSTRATED BULLETIN

Learn how STANDARD-HERSEY has aided manufacturers throughout the world in solving their dryer problems.



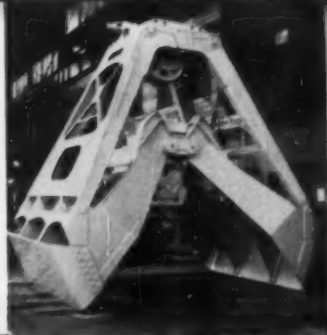
COMPLETE PILOT PLANT TAKES GUESSWORK OUT OF DRYING
STANDARD-HERSEY'S pilot dryers play an important part in solving your drying problems *before* blueprint stage.



STANDARD STEEL CORPORATION

5031 Boyle Avenue, Los Angeles 58, California; 15 Park Row, New York 31, New York

In ore clean-up buckets
FABRICATION SIMPLIFIED
WITH USS "T-1" STEEL
(and weight reduced more than ½ ton)



This photo courtesy of
 Blaw-Knox Company.



HALF AS THICK! In the trays for giant ore clean-up buckets, 1½" USS "T-1" Steel Plate, with a yield strength of 90,000 psi., replaces cast trays which were as much as 2½" thick. The new buckets—lighter in weight by more than half a ton—and expected to outperform the heavy cast trays, will be used at United States Steel's South Works.



• The trays of ore clean-up buckets must have phenomenal shock and abrasion resistance to hold up under constant scraping and scouring along the steel bottoms of ore boats. They are commonly made of heavy steel castings. But recently, Blaw-Knox Company, Pittsburgh, Pa., *fabricated* trays for several new buckets from USS "T-1" Steel Plate. This amazing new alloy steel assures the needed strength and durability, plus important fabricating advantages.

trays. Because "T-1" has tremendous resistance to impact abuse and abrasion, it is expected that it will outperform previously used materials.

For these ore buckets, "T-1" Steel is flame-cut to size, *cold formed* in a 1,250-ton press, drilled and then riveted to the bucket shell. "T-1" also can be welded—without pre- or post-heating. Because of its unusual combination of properties, it is cutting costs in many rugged applications.

LESS WEIGHT — LESS EXPENSE

Biggest single advantage of fabricating from "T-1" Steel Plate is less weight. New trays weigh only 4,021 pounds each, compared to 5,068 pounds for comparable cast manganese steel trays. Thus, "T-1" decreases the weight of the bucket and reduces shipping and handling costs.

What's more, fabrication from "T-1" simplified the building of these huge buckets. It eliminated the expensive patterns needed for cast

LOOK AROUND YOUR SHOP

In your own equipment, or in the products you make for others—wherever you would like to increase service life . . . wherever you would like to reduce fabricating costs of heavy-duty parts—look into the possibility of using "T-1" Steel. Competent technical advice is always available, of course—free of charge—from United States Steel. Write, wire, or phone for complete information. United States Steel, Room 5216, Pittsburgh 30, Pa.

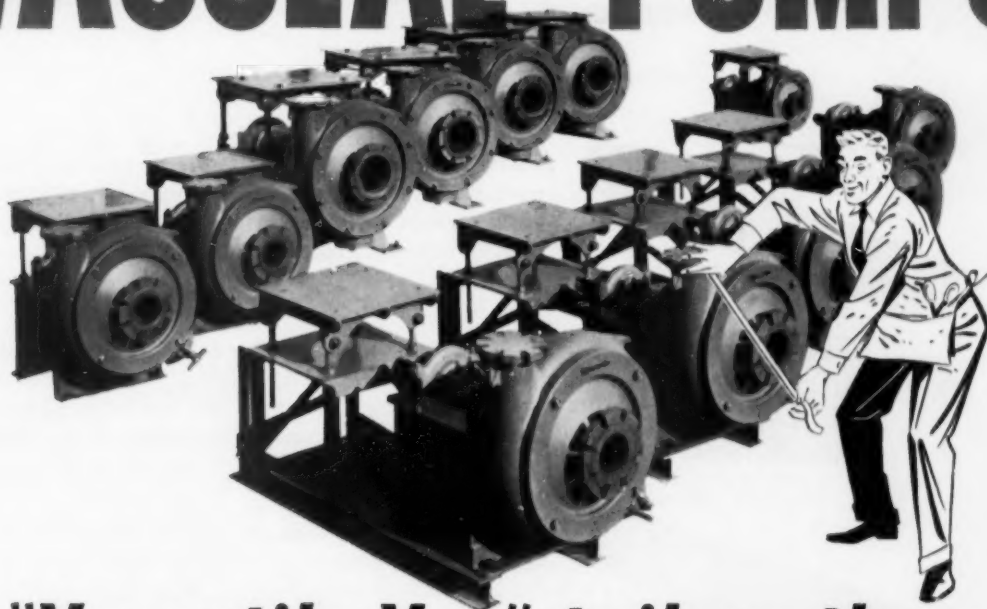
UNITED STATES STEEL CORPORATION, PITTSBURGH
 COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
 TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
 UNITED STATES STEEL SUPPLY DIVISION,
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 UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **"T-1"** CONSTRUCTIONAL ALLOY STEEL



UNITED STATES STEEL

VACSEAL PUMPS



"Versatile Vac" tailors them to all industrial requirements

With all the efficiency you would expect of a pump specialized for materials handling, VACSEAL pumps are 'tailored' for ALL kinds of pumping jobs in ALL industrial operations.

They can be rubber-lined, hard-iron or special alloy: acid proof or standard . . . providing a full range of handling abrasive or corrosive pulps. Motor mounts can be above or back of the pump or in practically any special position desired.

All VACSEAL Pumps have the NO-SEALING-WATER feature that prevents dilution and damage so often due to failure of clear water supply.

VACSEAL records of performance is a story you should certainly acquaint yourself with before choosing a pump for any use. Mail coupon for our new BULLETIN PB-55. No charge.

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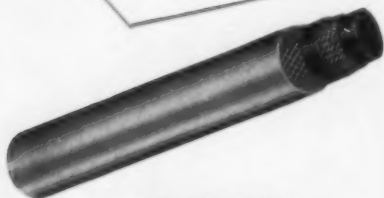
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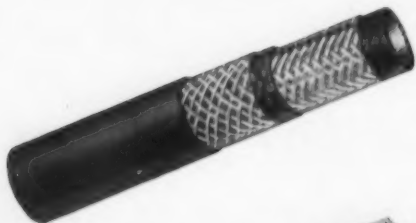
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AIR Extra lightweight, highly flexible hose for heavy duty work. Resists weather damage and abrasion. Non-porous tube of oil resistant rubber compound. Rugged Neoprene cover. Ideal for almost any hose installation.



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STEAM Many times stronger than wrapped fabric hose for general steam-handling jobs. Also lighter, more flexible and kinkproof for easier handling. Steel wire and glass reinforcing insures extra safety. Resists high pressures up to 388° F.



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Drifts and Crosscuts

Re-Indexed To Speed Your Reading

Did you notice the change in the editorial Table of Contents on page 3 of the February issue? Fine, now look at the Table of Contents on page 3 of this issue. Instead of the old-fashioned way of listing everything in page order from front to back, everything is now grouped by subjects, no matter on what page the item may be.

The idea is to help you, the reader, use and get more out of every issue of MINING WORLD. The Editor's dream, and just a dream quite frankly, is that every subscriber reads every item in the book every month and finds those choice items of special interest no matter on what page they may be. Practically speaking, we know that every individual reader has a special field of interest in one of the many phases of the diversified and complicated fields which make up the minerals industry—from exploration to pure metals. Also, that the reader looks first for these special fields so that he can read about them first. Accordingly, the Table of Contents has been engineered to help you find this field quickly so that you can spend more time reading the article.

All you have to do now is to look for the OPERATIONS-TECHNOLOGY heading to find the month's important articles, indexed by subjects, such as "Open-Pit Mining," "Flotation," "Exploration," etc. The new IN THE NEWS heading lists, by regions, current activities in the mining camps. Also fully indexed are the regular DEPARTMENTS, such as Fission Facts, Production Equipment Preview, etc., so long popular with readers.

Another reason for the new system is to make filing of articles easier for the engineering staffs, as well as the bosses secretaries. We know that many companies buy duplicate copies of MINING WORLD—one for intact filing, and the other for subject filing.

We know because readers tell us so, and just recently the proof came from the Philippine Islands. A consulting engineer had seen an article about aerial tramways several years ago while working in South America. When he left there he had to leave it in the company file. Happily, we were able to supply him with that issue of the magazine for his own file, and at a moment when he needed it for reference in designing a new ship-loading tramway.

Now it's simple—just file by subjects! Put everything about "Underground Mining" in the same file every month. Do the same for all the OPERATIONS-TECHNOLOGY articles.

This is just another way to make MINING WORLD more useful to you. Last year's Re-Cover-

ing with the titles of additional articles was part of the plan. It is all part of the blueprint for making reading faster, easier, and more profitable for today's busy readers.

High Principle

The Raw Materials Division of the United States Atomic Energy Commission, as you all know, has been charged with the procurement of adequate supplies of uranium for all foreseeable military and civilian needs. Jesse C. Johnson, director of the division, has long considered, and rightfully so, that private industry be speeded and encouraged to take over the job of finding and mining uranium. As part of this program he has considered that the Raw Materials Division be a training ground for engineers and geologists. In the days immediately following the end of World War II, there were only a handful of experienced men in uranium, and that experience was largely because of their work on the Plateau in vanadium. Therefore, the only training ground was within the AEC itself which was spending large sums to learn everything about uranium.

As part of the program to get uranium mining into private industry Mr. Johnson considered it to the advantage of the Commission for engineers to serve in the government school, so to say, then get out and find and mine more uranium for some company. In the field of ore processing the AEC metallurgists have evolved entirely new methods for recovering uranium—and other metals, too, in the future. The metallurgists are now leaving the Commission to take important industry posts directing uranium milling operations. Thus, they can best put Mr. Johnson's program of more uranium into effect.

The recent resignation of Sheldon P. Wimpfen as manager of the Grand Junction Operations Office caused much speculation as to what part with what company he would play in the Atomic picture. Some surprise was manifest when it was announced that he was accepting a position with the Glen Alden Corporation, a Pennsylvania coal company. High principle and moral integrity were evidenced by his decision to withdraw from the uranium field entirely, despite opportunities that were there to make use of his experience. As he himself expressed it "my wish was to get back into private industry as soon as I felt that my services had shown a measure of accomplishment which I had established for myself. I did not feel that I could in all conscience join the services of any private firm that had anything to do with uranium."



The "Lohed's" simple, rugged construction is evident in this view of the car in dumping position (with end cover removed).

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75 years experience aimed at one goal—reduce ore handling costs. That's the design and development story of Lake Shore's complete line of mine cars and related ore handling equipment.

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What's more, inspection and maintenance, when it's needed, is a snap. Just pull six pins to remove the car body from the truck.

Features like these add up to greater production, less down-time, lower maintenance costs, *reduced ore handling costs*. This advanced thinking is engineered into every Lake Shore car—standard and special models. Before you buy, talk to the people at Lake Shore and see how these advantages can be applied to your operation, to help you move more ore at lower cost.

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Capitol Concentrates

Silver Fight Appears Won In Senate But Producers Must Remain Alert

Although another hearing on the bill S. 1427 to repeal the Silver Purchase Act was held on January 10, only Senators from the western states appeared. Other witnesses have filed statements with the subcommittee. The hearing, it is understood, was mostly a face-saving measure for rumors around Washington indicate that both the Democratic and Republican leaders of the Senate have agreed not to take the bill up this session even if it should be reported by the Senate Banking and Currency Committee. Under those circumstances open hearings and reports would be a waste of time as the bill would die at the end of the session anyway. Mining operators must realize, however, that this is the closest shave silver producers have had in many years and they must exercise careful vigilance to prevent a recurrence. Once the act is repealed it might be impossible to obtain similar legislation. Generally, it is easier to block a repeal than to pass new legislation.

● Value of OMM Is Questioned

The new budget presented by the Administration calls for \$308,000 for the Office of Minerals Mobilization for the fiscal year 1957, or \$8,000 more than for the present fiscal year. As far as the eye can see so far, OMM has not justified the first appropriation. The House Interior and Insular Affairs Committee, looking into the organization of OMM, discovered a good many "WAE" men from industry had been appointed. These men are paid only for the days they work and, for the most part, are not on leave or severed from their companies. This certainly may be a money-saving device, but it always leaves the question of self-interest unanswered.

● Propose Extension of Mineral Programs

The first bill in the legislative hopper to propose an extension of the domestic mineral purchase programs is S. 2876 by Senators Malone and Barrett. There is nothing novel about the bill as, in general, it follows the pattern of S. 922 of the first session of this Congress. It would extend the programs for five years from their present termination dates and would add quantities of each mineral equal to the amount purchased under the programs up to the passage of the new bill. Due to an error in drafting the bill, it appears that the manganese carlot quota would be drastically reduced. Other minerals would fare all right.

As no appropriation is called for, the purchase money would have to come out of the Defense Production Act budget. Great screams of anguish can be expected from ODM Director Flemming, the Treasury, the Budget, and Senator Williams of Delaware. In effect, the bill would call for doubling the

amount of the expenditures made up to the passage (if passed) of S. 2876, which would be a sizable chunk of millions.

● Split Decision On Fluorspar Injury

The Tariff Commission's report on acid-grade fluorspar under Escape Clause Investigation No. 42, Provisions of Section 7 of the Trade Agreements Act of 1951 as amended, has finally been released. The six-man commission split 3 to 3, with Commissioners Brossard, Talbot, and Schreiber recommending "that the tariff concessions granted in General Agreement on Tariffs and Trade be withdrawn for an indefinite period." From the same hearings and sets of facts, Commissioners Sutton, Jones and Dowling came to the opposite conclusion and said, "there is no sufficient reason for a recommendation to the President for action in this case."

Because of the 3-to-3 split, two reports had to be transmitted to the President. Had either view registered a majority vote, only one report would have been written supporting that view, although perhaps with some dissenting comment should a commissioner be so minded.

This case is a prime example of how statistics may be juggled to support a point of view. As a matter of fact, regardless of how the figures are juggled, the most casual survey will convince even the intelligent layman that the fluorspar industry is being injured and may soon be reduced to the vanishing point.

● Budget Message Was Disappointing

Since the publication of the President's budget message things look dimmer and dimmer for approval by the Administration of any legislation which would extend the domestic mineral purchase programs. Not only is the rate of stockpile purchases to be eased, but the available money in the new budget will be about half what was called for in the last fiscal year. The net amount set up for stockpiling and defence production expansion for 1957 fiscal year will be only \$378,000,000, which probably would not be enough to pay for the cost of the Malone-Barrett bill, S. 2876, which would extend the old Malone-Aspinall Act for a further five years. On the other hand, \$65,000,000 will be asked to pay the costs incurred by the Department of Agriculture's barter program which has added a lot of foreign minerals to the stockpile. The domestic producer can't win, it seems.

● Russia's Titanium Output Is High

A recent article in a trade paper estimated that Russian production of titanium may be as high as 90,000 to 95,000 tons per year. Contrasted with a possible United States production of 10,000 to 15,000 tons per year and a target of 22,500 tons by 1958, this is a vast amount of the wonder metal. However,

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at the rate the Russians are supposed to be turning out their new military planes, the estimate might be justified.

Another interesting comment in the news item indicated that Russian production of titanium is entirely from ilmenite, a common ore in the United States, while we depend upon imported rutile almost entirely. It seems to be generally agreed that missiles and supersonic planes containing titanium fly higher, further and faster than those made with more conventional materials.

• Another Free Market For Gold

A recent newspaper item stated that the sale of gold has been freed from all restrictions in the Grand Duchy of Luxembourg as well as in Belgium. The free gold movement progresses slowly, but it does progress.

• Manganese Treatment Plant Is Proposed

Among the early bills dropped into the legislative hopper at this session of Congress is H. R. 7955 by Representative John Rhodes of Arizona. His measure would direct the Secretary of the Interior, acting through the U. S. Bureau of Mines, "to construct, maintain, and operate a commercial-size plant to beneficiate low-grade manganese ores, said plant to be located in such proximity to Wenden, Arizona, and Deming, New Mexico, as will minimize transportation distances from the plant to known sources of low-grade domestic manganese in said areas." A restriction contained in the bill forbids the discontinuation of operations, the dismantling, selling or leasing of the plant without specific authorization of Congress.

Rhodes has commented that he is convinced that such a processing plant is feasible and that since the government already has such a big investment in these low-grade domestic ores, steps should be taken to convert them into a useable form.

The bill has been referred to the Committee on Interior and Insular Affairs. Hearings there may force the hand of the U. S. Bureau of Mines concerning the success of its research programs on methods of recovery.

COMING CONVENTIONS

March 4 through 7. The 24th annual meeting and convention of the PROSPECTORS AND DEVELOPERS ASSOCIATION, Royal York Hotel, Toronto, Ontario, Canada.

March 18 through 24, 1956. Joint meeting of the AMERICAN MINING CONGRESS ON SURVEYING AND MAPPING and the AMERICAN SOCIETY OF PHOTOGRAMMETRY, Shoreham Hotel, Washington, D. C.

March 19 to 21. INDUSTRIAL DIAMOND SYMPOSIUM, Illinois Institute of Technology, Chicago, Illinois.

April 23 through 25, 1956. Colorado School of Mines SYMPOSIUM ON ROCK MECHANICS, Golden, Colorado.

May 10 and 11. Two-day MINING CONGRESS ON SIGNIFICANCE OF ATOMIC ENERGY sponsored by Southwest Research Institute and Atomic Industrial Forum, San Antonio, Texas.

May 10 through 13. NATIONAL OIL AND URANIUM EXPOSITION featuring machinery exhibits and mechanical devices, Texas State Fair Grounds, Dallas, Texas.

May 11, 12. INSTITUTE ON LAKE SUPERIOR GEOLOGY sponsored by the Michigan Geological Survey and the Exploration Subcommittee of the Upper Peninsula Section of the AIME, Michigan College of Mining and Technology.

June 7 to 9, 1956. THIRD INTERNATIONAL LIGHT METALS CONVENTION, Montanistische Hochschule, Leoben, Austria.

June 25 through 29. Annual Meeting AMERICAN SOCIETY FOR ENGINEERING EDUCATION, Iowa State College, Ames, Iowa.

June 28, 29, 30, and July 1. NATIONAL OIL AND URANIUM EXHIBITS featuring machinery exhibits and mechanical devices. The 48th District Agricultural Association Building, Santa Ana Freeway and Eastern Avenue, Los Angeles, California.



CYANAMID

REAGENT NEWS

"ore-dressing ideas you can use"

AEROFROTH® 65 *Frother* *Improves Gold Flotation*

This recent report from a Cyanamid Field Engineer tells how AEROFROTH 65 Frother is used to improve overall gold recovery at a Mexican gold-copper operation:

"This plant treats approximately 500 metric tons a day of complex copper ore occurring with gold and pyrite in quartz and calcite. A copper concentrate is produced by flotation with AEROFLOAT® 208 Promoter at 0.1 lb. per ton. Metallic gold is recovered from the copper concentrates, as well as the flotation tailings, through the use of blankets. Before switching to AEROFROTH 65 Frother a combination of cresylic acid and AEROFROTH 70 Frother was used at the rate of 0.5 lb. per ton of ore milled. Present consumption of AEROFROTH 65 Frother is only 0.005 lb. per ton, viz:

Period	Frother	Consumption lb./ton	% Au Recovery
Previous 5-month	cresylic—F70	0.5	72.10
Last month	AEROFROTH 65 Frother	0.005	77.44

"With AEROFROTH 65 Frother in a high-lime circuit at pH 11.2 to 11.5, the gold appears to be more floatable than with other frothers. Since payment for gold in the copper is the same as for gold as bullion, the operators are very pleased with the increased recovery by flotation and the reagent costs".

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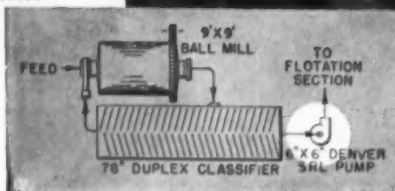
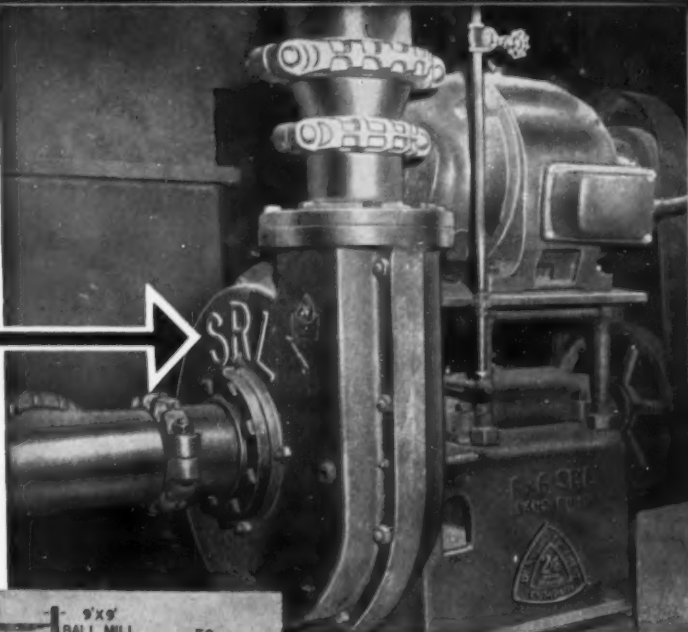
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DENVER SRL PUMPS AT Climax

Here's why Climax Molybdenum Company has 44 Denver SRL Sand Pumps in it's modern, efficient mill



A 6"x6" Denver SRL Sand Pump operating at 690 r.p.m., handling 2200 tons per 24 hours of -28 mesh classifier overflow material at 45% solids. Life of pump runner and casing liner was 593,000 tons.

BACKGROUND

Originally, a 2"x2" Denver SRL (Rubber Lined) Sand Pump was installed on a trial basis at Climax to handle coarse, abrasive -28 mesh deslimed pyrite flotation concentrates. Later, Climax purchased one 6"x6" Denver SRL Pump to handle the problem described with the photo above.

RESULT

Operation of these original Denver SRL pumps was so successful that, as a direct result, 42 additional Denver SRL Sand Pumps have been installed in this outstanding mill. These new pumps vary in size from the 2"x2" SRL (Open Runner) to the 8"x6" SRL-C (Closed Runner).

REASON

The Climax operators have found the efficient, trouble-free operation of Denver SRL Pumps entirely satisfactory. Life of wearing parts is long and shut-down time minimized. Horsepower requirements have been low and high efficiencies have resulted. Obviously, the Denver SRL is a big success at Climax.

HOW DENVER SRL PUMPS CAN REDUCE YOUR PUMPING COSTS

Send full data to us today regarding your particular pumping problem. Experienced DECO engineers will evaluate your problem and will return correct and workable recommendations immediately. This will obligate you in no way.

We carry replacement parts for all sizes of Denver SRL Sand Pumps in our Denver stocks. This enables us to give you prompt service whenever you may need it.

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Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

March 1956

—INTERNATIONAL PANORAMA—

CLARINGTON, OHIO—Olin Mathieson Chemical Corporation will build a 60,000-annual-ton, fully integrated, aluminum plant here. Bauxite will be imported from Surinam, South America.

JOHANNESBURG, UNION OF SOUTH AFRICA—Gold production in the Union in 1955 reached an all-time annual high of 14,602,267 fine ounces—195,506 ounces more than the record set in 1941.

MONTPELIER, VIRGINIA—Metal and Thermite Corporation will develop a rutile-ilmenite mine here and build a gravity concentration plant. First production is scheduled for the fall of this year.

NOUMEA, NEW CALEDONIA—The firm "Le Nickel" will install new equipment at its nickel mines, processing plants, and refineries to meet its goal of 10,000 annual tons of nickel. A power plant on the Yate River is also to be built.

LIMA, PERU—Marcona Mining Company is installing a 10-ton-per-hour pilot plant to develop a flowsheet to beneficiate iron ore using sea water at its iron mine in southern Peru.

KIRAKUD, INDIA—Indian Aluminium Co., Ltd. is to build a 10,000-annual-ton aluminum plant here. Locally mined bauxite will be used.

BOGATA, COLUMBIA—A large iron ore deposit assaying 45 to 50 percent iron has been found near Acerias Paz del Rio.

CLEVELAND, OHIO—Republic Steel Corporation has arranged to buy one half of Crane Company's interest in Cramet, Inc., a titanium sponge producer with a plant at Chattanooga, Tennessee.

SINGAPORE—Aluminium Ltd. of Canada's wholly owned subsidiary, Southeast Asia Bauxite, Ltd., has signed a five-year contract for Ramunia Bauxite, Ltd. to mine and treat bauxite ores in Johore. Initially 40,000 annual tons will be mined.

BILLINGS, MONTANA—Discoveries of tyuyamunite in the Madison limestone at Pryor Mountain are believed to be significant by United States Atomic Energy Commission geologists. Three companies have started shipments to AEC's Riverton, Wyoming ore buying station.

CLEVELAND, OHIO—Cleveland-Cliffs Iron Company will own 47½ percent of the stock in a new company to be formed by four steel companies. Marquette Iron Mining Company will be its name, and will lease the Republic and Empire mines in Michigan.

QUEENSLAND, AUSTRALIA—Australasian Oil Exploration Ltd. announces it has obtained beach mining interests in Queensland, covering 20 miles of beaches and 40 miles of sand dunes. Preliminary test holes on the sands have revealed the presence of rutile-bearing sands.

BUFFALO, NEW YORK—Kennecott Copper Corporation has taken an option to buy a large tract of land on River Road in Tonawanda, New York for industrial development. Plans for its use have not been disclosed.

KINROSS, UNION OF SOUTH AFRICA—Two United States companies—Newmont Mining Corporation, and American Metal Company, Ltd.—are part of a group of mining companies financing the first gold mine here. The Kimberley Reef will be mined. Early production, at rate of 60,000 tons monthly, is expected by mid-1958 because of shallowness of ore bodies.

NAICA, MEXICO—The Fresnillo Company has purchased the Gibraltar mine which adjoins its own lead-zinc-silver ore deposits now being developed through the Naica Lease. Mill capacity will be increased to raise production by 50 percent.

CZESTOCHOWA, POLAND—The new Malice iron ore mine, which was partly equipped by the U.S.S.R., has started operation.

MANILA, PHILIPPINE ISLANDS—The Philippine government has set March 31, 1956 as the final deadline for submission of bids by firms interested in developing the nickeliferous iron deposits on Surigao.

KELLOGG, IDAHO—Bunker Hill & Sullivan Mining and Concentrating Company has optioned 53 zinc-lead claims in British Columbia. This is the first time Bunker Hill has entered this mining district.

Cleveland-Cliffs to Lease Republic and Empire Mines

Cleveland-Cliffs Iron Company of Cleveland, Ohio, is forming a new company to lease the Republic and Empire mines in Michigan, and to own the concentrating and pelletizing plants. Four steel companies will participate in the firm which will be called the Marquette Iron Mining Company. Identity of these companies has not been revealed. Cleveland-Cliffs will have a 47½ percent interest in the company and will operate the properties.

Labor Costs Needed

In the report on "Labor Hours: A True Metal Price Gauge" on page 46, Frank G. Breyer has accurate cost figures for the increases in wages and "fringe benefits" for smelting for a long period of years. He needs similar figures for mining and milling to complete his cost studies and charts. If you have such figures, please send them to MINING WORLD so that Mr. Breyer can compile similar charts. The name of your company will be confidential if you wish.

Aluminium Ltd. To Build Reduction Plant in India

India's primary aluminum capacity will undergo a major expansion which will more than double output of ingot by 1958. Indian Aluminium Company, Ltd., subsidiary of Canadian controlled Aluminium Ltd., plans to start work on a 10,000-annual-ton reduction plant this year. The outlay for the new facility will be about \$15,000,000.

The smelter will be built at Hirakud in the State of Orissa. Power will be supplied from a new multi-purpose hydro-electric plant being built by the Orissa State Government and now nearing completion. According to reports, the smelter will be capable of expanding production to 20,000 tons per year if conditions warrant.

There is a plentiful supply of bauxite in India, but present primary capacity is estimated at less than 8,000 tons. Aluminium Corporation of India has a reported capacity of 2,000 tons annually. The Indian Aluminium Company, Ltd. now has a plant operating at a yearly rate of 5,000 tons. The Canadian subsidiary has been active in India for a great many years and has established a fully integrated industry which mines Indian bauxite, produces alumina, makes primary ingots, and fabricates a variety of semi-finished products.



MINING METHOD at Standard Uranium was designed for gismo operation to take advantage of complete mechanization for the 9-foot thick ore body. One man, using this machine

made by Sanford Day Iron Works, can muck out a 20 by 9-foot room and pillar heading, and tram the ore to a transfer raise in half a shift. Gismo hopper holds 6 tons of ore.

Standard Uranium Mechanizes Big Buck Mine With Gismos

By **STANLEY H. DAYTON**
Associate Editor

One of the newest additions to the ranks of highly mechanized mines is Standard Uranium Corporation's Big Buck operation in San Juan County, Utah. This producer specifically planned a complete mining system around three basic machines—the self-loading ore transport, the drill gismo, and a tractor.

With the help of these three fundamental items of mine equipment, a crew of 10 underground specialists is able to produce more than 20 tons of uranium ore per man each shift. The orebody at Standard Uranium was not opened until January 1955, and full productive capacity was not reached until early in April. Yet by September, after only six months of operating experience, the company had achieved a direct cost figure of \$5.33 per ton mined. All indications

are that overall efficiency will be improved even further once mining cycles are completely coordinated.

The deposit at Standard Uranium is admirably suited to mechanized operations. The orebody has a gentle dip. The thickness is great enough to warrant room and pillar mining over the greater portion of the lateral extent. With roofbolts, the ground will stand open over fairly wide spans without developing undue weight.

What sold Standard Uranium on the use of the gismo? Probably more than anything else was the impressive record which American Zinc, Lead & Smelting Company was able to achieve at the Grandview mine in Washington where the gismo was first developed and used by Dale I. Hayes. Another prominent factor which weighed in favor of the gismo was the relatively low initial investment required for the equipment.

This is what Standard acquired in order to operate: a mucking gismo, a

standby gismo on which drills are mounted, a tractor and a stoper adapted to roofbolting. If capital cost were to be cut to the bone, the drill gismo could be eliminated and rock drills mounted on the mucking gismo after a heading had been cleaned up. Overall efficiency would be lowered, however, because with the two units available, drilling and mucking can be carried on simultaneously throughout the entire shift.

If the conventional Diesel equipment were employed, the same number of units but a greater expenditure of funds is necessary. This is because more engines are required. The front end loader needs a prime mover; the shuttle car or truck requires a power plant. Only one source of power is needed for mucking and tramping when using the gismo.

Manpower Saving

Another obvious advantage is the

reduction in manpower with the gismo method of handling ore. One man loads and trams the ore to disposal points. If shuttle cars are used with a loader, another man is necessary.

Finally, it should be pointed out that the gismo provided Standard Uranium with an all-purpose machine with which the firm could completely mechanize all but a very small portion of its underground operation. The self loading transport requires only a 7½-foot headroom in order to gather a load. This factor is quite important, because the deposit thins to about 5 feet in thickness at the boundary. This zone can easily be extracted with slushers and scrapers. Front end loaders, which need more headroom, would lengthen the boundary area which would have to be worked by scraping.

Average Thickness: 9½ Feet

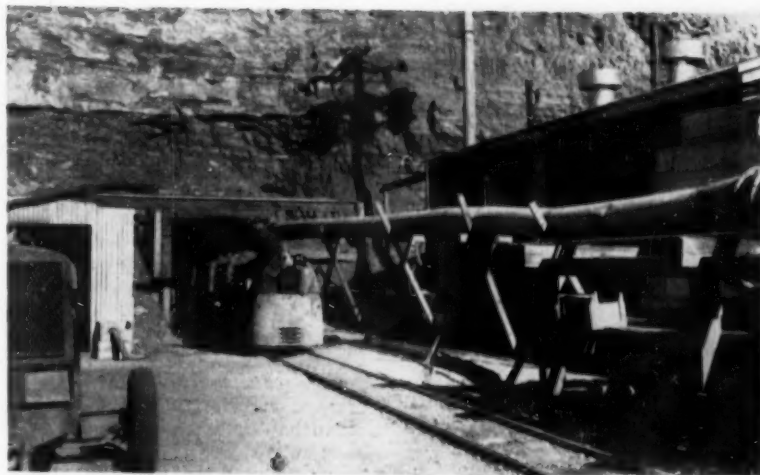
The Big Buck claims, which adjoin the Charles A Steen Mi Vida mine, were acquired by Standard Uranium early in 1954 from Mr. Steen and William McCormick. After a surface drilling program, construction of a surface plant started the same year.

The deposit strikes approximately north 35° west, and exhibits a fairly constant 10 to 11° southwesterly dip. The average thickness is about 9½ feet though local rolls and swells may increase this to 14 feet. Some thinning is in evidence near the extremities of the ore body where 5-foot mining heights will prevail. The ore occurs at the base of the Chinle formation at the contact with the Cutler series.

Main Haulage Is Trucked

The mine is opened by a long 8-by 9-foot adit which crosscuts the formation in a northeasterly direction. The entry was collared in the hanging wall Wingate formation, crosses the Chinle-Cutler contact 1,500 feet from the surface, and at 1,900 feet from the portal branches northwest and southeast, following the strike in the footwall below the ore. Transfer raises connect the footwall drifts with the ore horizon.

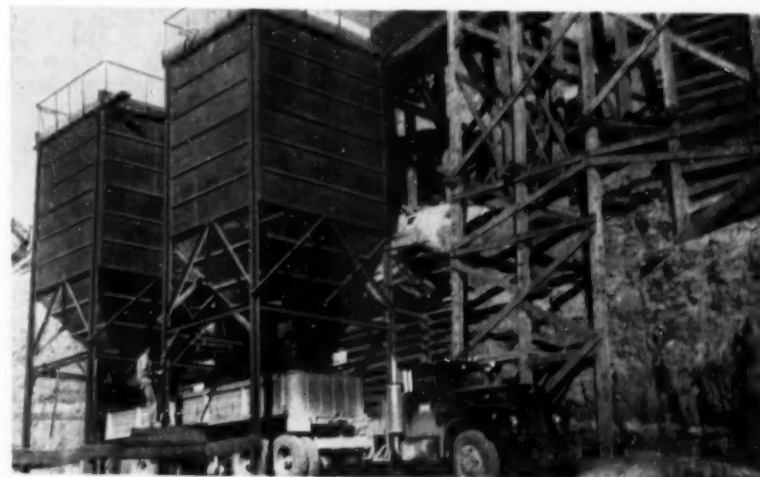
The adit is located high on the south side of Steen Canyon and 2,000 feet southwest of the Mi Vida mine. While it was being driven an average advance of 24 feet per day was maintained with three shifts working. The equipment used at this stage included: a Joy two-machine jumbo; an Eimco model 21 Rocker Shovel; a Mancha Diesel locomotive and C. S. Card 3-ton cars. The adit is tracked with 45-pound rail on 24-inch gauge, and together with the branching foot-



ORE LADEN TRAINS reach the portal after traveling over more than 2,400 feet of straight, well ballasted track. Ore is collected at the bottom of transfer raises which connect footwall drifts, below the ore body, with stope development.



TWO MAN TRAIN CREW dumps the ore into bins located below the track level. The Mancha locomotive made by Goodman Manufacturing Co. is powered by a 67 horsepower Diesel engine. Granby cars made by C. S. Card Iron Works have 3-ton capacity.



ONE MINER'S DAILY OUTPUT will be shipped to the Moab buying station when the trailer hauled by the Mack truck, pictured above, is loaded with 22 to 23 tons of ore. Each of the steel bins at Standard Uranium holds 100 tons of ore.



wall drifts serves as a main haulage-way.

Service Incline Divides Ore

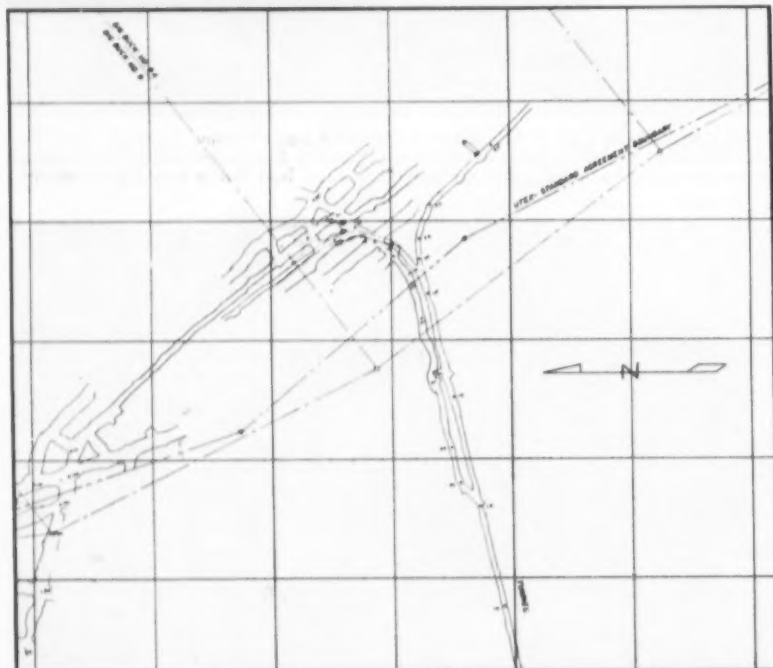
At the contact of the Chinle beds with the Cutler, a dip-slope raise, which branches off the adit, was driven up the 10° dipping ore body, in the ore, and to the opposite boundary. This service incline crosses the deposit at its approximate center. A series of six parallel strike drifts, which are 20 feet wide and spaced on 40-foot centers, are driven at right angles from the incline. These headings are carried the full height of the ore and will furnish the entire mine production until the limits of the deposit are reached. The 20-foot pillar which is left between adjacent drifts is holed every 50 feet by 20-foot-wide laterals as the workings are extended.

Gismo Trams 200 Feet

From the footwall drift a series of 70 to 80° raises will be put up to hole one of the strike drifts on 230-foot centers. Total height of these raises is 90 feet. These openings will serve as transfer raises, and ore will be tapped from the chutes located in the footwall, haulage drifts.

The important point to remember

ROCK BOLTING crews follow mucking operations. A miner drives home a CF&I bolt with a Gardner Denver R94 stoper.



PLAN MAP shows how development headings in ore are laid out and location of foot-wall haulage drifts which connect with the entry adit. The service incline branches off the adit 1,500 feet from the portal. Scale is 1 inch to 100 feet.

TABLE No. I
Mining Costs at Standard Uranium

Total direct mining cost per ton	\$5.33
Indirect mining cost per ton	0.86
Administrative and general expense per ton	0.18
Total cost per ton*	\$6.37

*Excludes depletion allowance, amortization of deferred development expense

in this development program is that the maximum tramming distance with the self-loading ore transport is about 200 feet, a distance range within which the gismo was designed to operate at maximum efficiency.

The lower level serves a double purpose. The primary function, of course, is haulage. As mine development progresses, however, the lower level will figure importantly in future plans for pillar recovery. Preliminary thought has already been given to this problem, which one day will plague many operators whose uranium mines are now highly mechanized.

The gismo method of mining, as developed by Standard Uranium under superintendent Robert Durk, includes nearly continuous drilling and mucking. This permits a certain degree of specialization among the miners. For instance, some men just naturally develop into better loading machine operators, while others are faster at drilling.

Four Machine Jumbo

The drilling unit is positioned at a face by the tractor which is then uncoupled and transferred to duty with the self-loading transport. The drill gismo contains four jib-mounted drill machines. Two are Gardner Denver 3½-inch drills, the remaining two are Ingersoll Rand DB-30, 3-inch machines. To drill a typical heading 20 feet wide by 9 to 12 feet high requires approximately half a shift. This means that the tractor is required for a few minutes twice each shift to move the jumbo to a new heading. The tractor is free for the remaining time to work with the mucking unit.

In many of the uranium mines in the district drill jumbos mount only two machines. At Standard, officials figure that by adding two more machines drilling efficiency has been increased about 50 percent. Normally, two men are required with a two-machine jumbo; two men operate the four drills on the gismo at Standard.

Drill Footage

The feed shell for each machine is 12 feet long, and the present practice is to use one steel, 10 feet long, for boring blast holes. It takes about 60



BOTTOM DUMPING GISMO (at left) unloads ore at a transfer raise which is narrowed to 3 by 5 feet at the top so that the tractor and self loading transport will straddle the opening.



When the dipper is elevated (right) the forward section of the hopper, bottom raises to crowd muck to the rear. Maximum tram to any transfer raise is 200 feet.

to 70 holes in a 20 by 10-foot heading, which will average out to about 650 feet of hole per round. Drill footage per day has varied from 1,300 to 1,500 feet. Non drilling time includes time for moving and connecting hoses at new headings. Timken, detachable, tungsten carbide bits are used. Life is 1,000 to 1,400 feet per bit. The holes are placed on approximate two-foot centers, and a five hole burn cut is used. The round is broken with Atlas 1½ by 8-inch powder and primed with Atlas Rockmaster caps, which have produced very good fragmentation.

Standby Mucker

The question may be asked "why use a gismo mounted with jibs, rather than some other conventional jumbo?" The answer to this is that the drill gismo fits in perfectly with the normal cycle of operations. If a self-powered jumbo were used, considerable expense would be involved in acquiring a tractor—much more than required for a second gismo. For drilling, all that is needed is a stable platform mounting the drills. A drill mounting on the gismo provides the company with a standby mucking unit. If the present mucking gismo ever needs replacement, the drill assembly can be transferred to the worn out unit and the drill gismo used for mucking. In addition, a great deal of weight can be added to a gismo drill jumbo to provide a more solid platform. The hopper can be partially or completely filled with muck greatly increasing the stability of the unit.

Gismo Control on Tractor

Mucking is the basic job for which the gismo was designed. One man, operating the controls from the Eimco

105 tractor, mucks out a heading and transports the ore to one of the 5-by-5-foot transfer raises. The tractor tracks and gismo tracks are wide enough to easily straddle the raise opening which is narrowed at the top by timber, or steel and concrete to 3 by 5 feet. No grizzly is used over the raise. When the gismo is spotted over the raise, the bottom dump hopper is opened by a control on the tractor and the load dropped into the raise. Thus, one man and one unit (tractor and gismo) can clean up and dispose of muck in a heading.

The gismo operates by scooping rather than on a crowd and dig principle. The tractor eases the gismo, with the 72-inch-wide bucket lowered, into the muck pile. The forward motion of the unit crowds muck to the back of the scoop. When the dipper is raised to maximum height, the forward half of the hopper floor is also elevated, which forces the muck to the rear of the hopper and clears the scoop. The operator backs the unit up slightly, then takes another

bite at the pile. About seven or eight passes are required to load the unit to its four- to six-ton capacity.

Payload Varies

The actual payload which can be handled by the machine depends largely on the physical characteristic of the broken rock. For example, the size and hardness of rock fragments and the relative compressibility of the muck pile are important factors. Soft friable or extremely fine material is more difficult to handle, the reason being that such a muck pile offers little reaction or resistance to the forward thrust of the scoop. A round composed of hard well-fragmented rock doesn't show this tendency to compress, as the scoop works under the toe of the pile. Instead, this material offers a greater resistance to the forward motions of the bucket, forcing muck to ride toward the rear of the machine.

Repair & Maintenance

The gismo will muck out a 130- to 150-ton round and transport the ore to the transfer raise in half a shift. The cycle of operations has been so planned that drilling, mucking, and disposal of ore to transfer raises is continuous. Repair and maintenance costs on the gismo has amounted to \$0.164 per ton. All other equipment maintenance costs have been \$0.565 per ton making a total equipment maintenance cost of \$0.729 per ton of ore mined. The amount of motive power furnished for the gismo has turned out to be an important factor in the maintenance picture. A 45 horsepower tractor was somewhat underpowered for the job. The installation of a much larger Eimco 105

Continued on page 84



GISMO MINDED Robert Durk, superintendent at Standard Uranium planned and developed the Big Buck operation.



A PORTABLE SLUSHER RAMP is used at Incline No. 3 to load a shuttle car which can be spotted under the framework

holding the Joy tugger. Mining heights at this lease vary from 4 to 8 feet. Headings are drilled with airlegs.

Four Corners Uranium Prospers By Leasing Small Deposits to Miners

How is uranium mined at some of the comparatively smaller ore bodies found on the Colorado Plateau? Four Corners Uranium Corporation provides a good case history with eight producing mines near Green River, Utah, two more at Lion Creek in Montrose County, Colorado, and five at Hamm Canyon in San Miguel County, Colorado. Each operation may produce anywhere from 5 to 50 tons of ore per day.

The mines at Green River are typical of the many small uranium operations in production at this time. The company drills and delineates a mineable reserve of ore, then leases the deposit to an individual or group of individuals under a split check system. Various lease operators use widely differing equipment and methods which serve to portray the ingenuity of the uranium miner.

When Four Corners was incorporated in 1952, the firm had a few promising claims and leases, but little

operating capital, no mining equipment, and only a skeleton mining or technical staff. However, the largest stockholder was the Silver Bell Mining Company then operating the lead-zinc-silver Carbonero and Silver Bell mines at Ophir Loop, and Old Ophir, San Miguel County, Colorado.

Silver Bell, under president Eugene H. Sanders, recognized the expansion opportunities which uranium offered and formed Four Corners. Mr. Sanders was quick to transfer Silver Bell's staff and operating experience to Four Corners, and perhaps most importantly was able to secure the services of experienced vanadium-uranium operators. This foresight has been justified because today Four Corners is continuing to expand and is now one of the leading independents in uranium while Silver Bells has suspended its base metal operations.

Four Corners Uranium has spread into five states—Utah, New Mexico, Colorado, Arizona and Wyoming—

paying its way as it goes. An active exploration department, headed by Dr. Edward L. Clark, vice president of exploration and development and former head of the Missouri Geological Survey, is constantly investigating new areas which appear favorable for mineralization.

The first problem that confronted the new company was how to develop and get its prospects into production as quickly as possible with the least capital expenditure. The natural answer was to lease blocks of ground to qualified firms or individuals with operating know-how and machinery and then to divide the profits. This was exactly what was done at the Green River holdings.

Profits Split

Leasing offered the quickest avenue of approach for getting properties in production in a hurry. Under the terms of each individual lease, the

lessee furnishes all equipment and men; Four Corners Uranium furnishes exploration and engineering services. The receipts from ore sales are split according to a pre-determined arrangement between the leasor and lessee. The lessee commonly pockets 40 to 60 percent of the check from Atomic Energy Commission authorized ore-buyers.

The split-check leasing system resulted in these advantages to Four Corners:

1. Development of mines obtained for small outlay of funds.
2. Ore is produced with small working capital.
3. Drastically reduced the amount of supervision necessary.
4. Better ore extraction. A lessee can work a much smaller ore body because he has less overhead and administrative expense.
5. In the final analysis, leasing set-up Four Corners for business and enabled it to acquire needed funds for property acquisition in other areas.

For the lessee these advantages are apparent:

1. Increased his take-home pay.
2. Provided the incentive to do a better job.

Geologic Setting

The largest group of mines are about 15 miles southwest of Green River, Utah on the northeastern edge of the San Rafael Swell, an ellipsoidal-shaped anticlinal dome. In this vicinity, Four Corners has consolidated a group of claims. The holdings measure about 12,000 feet in a north-south direction and 3,000 feet wide along the east-west axis.

The dominant structure in the region is the San Rafael Swell which exhibits a closure on all sides. This feature measures approximately 70 miles along the longer northwest axis and 30 to 40 miles wide. The upper formations, near the geometric center, have been eroded away to expose the Entrada and older formations. At the Four Corners holdings, on the edge of the swell, geologically younger sediments prevail. On approaching the site from Green River you are traveling down the series from near the top of the Mancos shales which range up to 800 feet thick. The Dakota sandstone is quite thin in this region and in some cases is absent completely. The underlying Morrison formation is 590 to 637 feet thick, and the Salt Wash member is the hostrock.

Ore in Transverse Warps

In the area encompassed by the holdings of Four Corners Uranium,

the regional bedding strikes northwest around the nose of the dome on the northeast. The uranium deposits occur in a nearly parallel series of very gentle flexures and minor warps normal to the general strike of beds along the dome. The mineralization shows up in these several transverse structures which seem to follow a general North 30° East trend. One school of thought is that whether the uranium was concentrated by ground water action on dispersed uranium in the country rock or by ascending solutions, it was deposited in the structural traps formed by a system of slips and rolls which dammed the cross-warps.

The chief ore mineral found is uraninite, though carnotite is fairly abundant near the surface. The vanadium content of the deposits is unpredictable. Shallow ore is usually higher and deeper ore lower in vanadium. The shipments made to date have averaged a vanadium-uranium ratio of 1 to 1. The Green River ore can be classed as high lime, usually carrying up to 10 percent CaCO_3 .

Drilling Is Contracted

Actual drilling operations to delineate ore are contracted to three drill contractors by Four Corners. The eight operating leases near Green River are now confined to the north-

ern half of the holdings. The southernmost Incline No. 8 mine marks the approximate halfway point. The area south of this mine is relatively unexplored by drilling.

Myers Exploration Company has a contract for 100,000 feet of drilling. This organization is using a Model 1000 Mayhew rotary rig. The contract is based on a cost of \$1.50 per foot. Most deposits range from 35 to 200 feet in this area.

Whatley Drilling Company has a 60,000-foot contract and uses a Model 1000 Mayhew rotary drill mounted on a mast which folds up on a truck bed. The truck also carries a Davey compressor rated at 480-cubic-feet per-minute which is driven by a power take-off from the truck engine. The mast is high enough to accommodate 20-foot lengths of steel. Drill hole cuttings are removed by air. The cost per foot varies from \$1.20 to \$1.50 depending on conditions.

A third contractor, the Cline Drilling Company, operates a wagon drill at a cost of \$0.60 per foot. This drill is mounted on an Autocar and carries a Chicago Pneumatic compressor rated at 300-cubic-feet-per minute.

Probing

Though drilling costs are cheaper with the percussion tools, the rotary rig bores a bigger hole which stays



INCLINES ARE MOST POPULAR entryways to shallow deposits and are generally used to depths of 80 to 90 feet although many are deeper. This view shows the collar of Incline No. 3 where a gasoline engine on top of the ore bin hoists mine cars.

open longer and is easier to probe. The company depends strongly on results obtained by probing drill holes with a Babbel counter since the uranium in the area is in equilibrium. Dust samples are collected for assay checks, however.

Of the long, 12,000-foot, north-south axis of the holdings, the northern 1,500 feet have been well drilled. The next 5,000 to 6,000 feet have been reasonably well explored by bore holes through a 700-foot wide section. The southern half and fringes of the northern half are relatively unexplored yet. In 1955, the rate of ore discovery was 0.75 tons of ore disclosed per foot of drilling, a really outstanding result.

Mine production from the Green River group is shipped by truck to the Union Carbide Nuclear Company's buying station at Thompson, Utah.

Contrasting Methods

The contrast in methods and equipment used by lessees at Green River is striking. It reflects the great variety of opinion of various operators on how to mine a deposit though conditions from one mine to another are quite similar. Should a vertical shaft be sunk or does an incline offer the best entry? If the ore is only four or five feet thick should tractor shovels requiring an eight or nine foot clearance be used? Or, are rock handling costs too high to mechanize and is ore unduly diluted? If an inclined opening is used, should ore be hoisted in cars or hauled to the surface in shuttle cars? Should slushers be used to muck rounds so that stope heights can be limited to the thickness of the ore? Mechanized mines must blast ore and waste separately to obtain clearance for equipment.

At any of the eight mines the thinking of the lessee varies. Portable compressors, shuttle cars, tractor-loaders, airlegs, slushers, gasoline hoists, and gasoline-driven ventilation fans enter the mining picture. The exact choice of equipment depends on the lessee's preference. The following description summarizes methods used at the properties on the San Rafael Swell.

Incline No. 1

This operation is typical of one of the comparatively deeper deposits which Four Corners has in the Green River area. It has been leased to Wayne Watterson since November 1954. At that time he collared a vertical, two-compartment, timbered shaft measuring 4- by 8-feet, inside dimensions, and subsequently sunk 100-feet to reach the ore. The shaft entered the ore horizon in April 1955.

The average mineable thickness of the ore body is about five feet, though in places it may reach nine feet. At the time of MINING WORLD's visit, the lessee had mined two stopes adjacent to the shaft. The ore was slushed directly to a chute which loaded the 700-pound-capacity hoisting bucket directly. In one stope a cross haul was necessary before muck could be scraped to the loading chute. As development proceeds beyond economical slushing distances a ramp mounting a tugger will be installed underground. This unit will load a shuttle car in much the same manner as the work now being done at Incline No. 3 which is described later.

Stope and development rounds are drilled with a Thor Power Tool Company airleg. Blast holes are loaded with Hercules 45 percent powder.

The headframe is made of heavy timbers and the barrel-shaped buck-

ets dump ore directly to metal sheets which are high enough to load a truck.

Incline No. 2

This mine will be even deeper than Incline No. 1. The total depth to the ore is 130 feet. It also is opened by a vertical shaft, but unlike its twin, Incline No. 1, the 30-foot headframe was constructed of steel bars. The McDougal brothers are leasing this property from Four Corners Uranium and had reached a 30-foot depth in the shaft by the middle of September 1955. A daily advance of 7 feet was maintained in the 8- by 5-foot opening. Shaft rounds were mucked by hand into a 1,200 pound sinking bucket which was hoisted by a gasoline engine. The shaft reached the 130-foot level in November, and stopping operations since then have been carried out using slushers and airlegs.

Incline No. 3

The cover overlying this lease is comparatively shallow. The mine is developed by a downward-dipping, 36 percent incline which is about 100 feet long. Smith and Lucas of Drager-ton, Utah now hold the lease on Incline No. 3.

Development headings and stope rounds are drilled with Atlas Diesel airlegs. Mining heights vary from about four to eight feet. The primary unit used for mucking is a custom-made, portable ramp which mounts a Joy tugger on horizontal framework attached to the upper end of the slope sheet. A small, one ton-capacity, shuttle car, powered with a nine-horsepower Hallett Diesel engine, is spotted under the upper edge of the ramp and the platform holding the



MUCKING at Incline No. 6 (left) is done with an HD-5 Allis-Chalmers Tractor Shovel. For a time the loader trammed the ore up 22 percent grades to the surface, but plans were in the offing



to procure a shuttle car for this job. At right, the lessees at Incline No. 3 use a shuttle car which is loaded from a slusher ramp to haul ore to shaft.

scraper hoist. Broken ore is then slushed directly to the truck bed.

Hoist in Mine Cars

The shuttle car hauls the ore up a short 29 percent incline from the working face to the top of a loading pocket located in an opening just above the inclined entry to the mine. The pocket has a total capacity of 10 tons and loads an end dump mine car through a chute at the bottom. The car is brought to the surface by a hoist powered with a Skagit gasoline engine which has two speeds forward.

The hoist itself is located on top of a 30-ton ore bin standing approximately 18 feet high. Waste rock from development headings was used to fill the space under the sloped trestle, connecting the collar of the incline with the top of the bin.

One interesting innovation developed by the lessees at this mine is the use of an air-powered starting motor for balky engines. The basic unit they used was an air motor from a discarded drill. They fitted the motor with a chuck which slips over the crank shaft of the shuttle car engine, and have saved untold backwork and tempers due to hand cranking.

Incline No. 4

Incline No. 4 is leased by Kiabab Mining Company who use an International Harvester TD-6 for underground mucking. The ore is loaded in a one ton mine car by the tractor-loader and hoisted to the surface on a tracked, 33 percent incline. The surface installation is very similar to that found at Incline No. 3, consisting of a 30-ton bin with a gasoline hoist mounted on top. The hoistman takes care of dumping the ore cars.

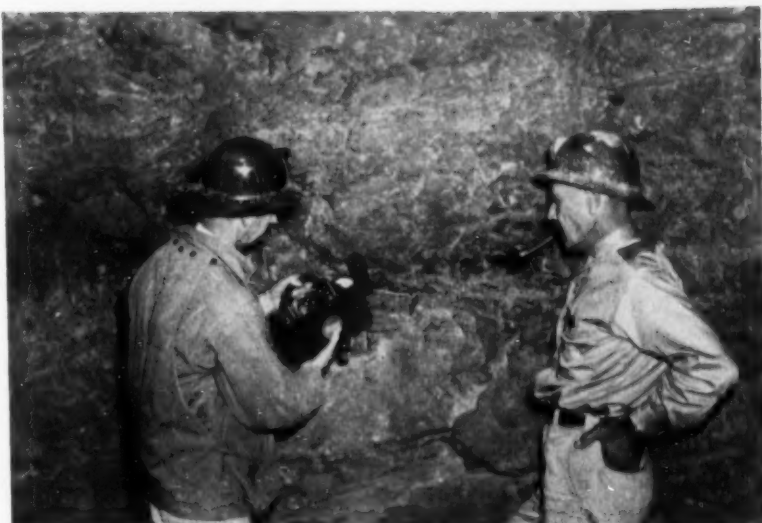
Incline No. 5

The lessee, Joe Baker and his operators, slush all ore directly to one ton mine cars. The cars are hoisted up a 25 percent grade which steepens to 33 percent near the surface. Here again a 30-ton bin receives the mine production.

Incline No. 6

J & M Mining Company obtained the lease on this particular deposit which is one of the biggest producers which has yet been developed on Four Corners Uranium holdings in the Green River area. This is an example of small mine mechanization which has been dominant in the thinking of this operator.

The average thickness of the deposit is five to six feet. At the time

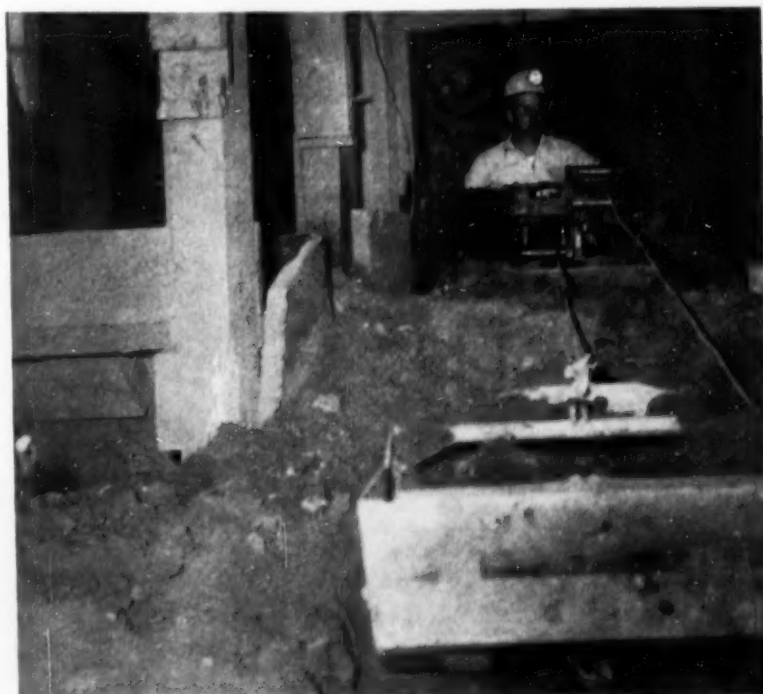


A THIN SEAM of mineralization is checked with a Babel scintillation counter by Dr. Edward L. Clark (left), vice president in charge of exploration, and Walt Gramlich (right), a vice president and director of Four Corners Uranium Corp.

of MINING WORLD's visit a total of six working faces had been opened up. The entry way is an 8- by 7-foot downward dipping incline on a 22 percent grade. At a point 67 feet from the collar, the incline has a switchback and the direction of travel is back under the surface opening. The first mining level is 87 feet below the switchback, and from there it's another 27 feet to the bottom.

Rounds are drilled with Atlas Diesel rock drills on airlegs. An Allis Chalmers HD-5 Tracto Shovel is used for mucking, and hauling ore to the surface. The bucket capacity of this machine is slightly over one yard, and the minimum headroom required for operating clearance is eight feet. This means that ore and waste must be broken separately for proper working.

Continued on page 84



SLUSHER made by Gardner Denver Co. is used by Charles Watterson to reclaim broken ore at Incline No. 1 where average thickness of ore is 5 feet. Contrary to most operations, this deposit is opened by a vertical shaft.



NEW EUCLID S-18 SCRAPERS move into the open-pit stripping area where Pacific Coast Borax Company is developing

a new mine south of the old West Baker underground shaft shown in the background. Picture was taken in January.



STARTING OPEN PIT are W. H. Wamsley, Pacific Coast Borax mine superintendent; C. V. Isbell, Isbell Construction president; P. J. O'Brien, PCB vice president; and R. Kendall, PCB open-pit engineer.

Dirt Flies At Two

The PACIFIC COAST BORAX COMPANY is stripping 10,000,000 tons of overburden to develop the world's first major open pit borax mine at Boron, California. Isbell Construction Company of Reno, Nevada is doing the stripping under contract. The first overburden was removed on January 4th. The contract, to be finished in May or June, will excavate an open pit 1,500 to 2,000 feet in diameter, and 150 feet deep; it will adjoin, on the south, the company's West Baker underground mine. Developing the new open pit mine is part of Pacific Coast's \$18,000,000 program to expand production.

Pacific Coast Borax has been using underground methods for some 30 years in mining the flat lying borate beds. It is anticipated that underground mining will continue until the open pit is in full production in mid-1957.

Pacific Coast Borax president J. M. Gerstley said that the new mine and new refinery are part of the company's program in "... keeping up with the increasing demand created by research which is constantly uncovering new and important uses."



FIRST LOAD of desert sand is loaded into Euclid S-18 at right with a Caterpillar D8 pushing. Empty scraper at left.



FAST RETURN from waste dump is made by one of five Euclid S-18 scrapers which holds 24 cubic yards.



LOADING NEW WOOLRIDGE scrapers at Pima Mining Company's copper stripping job by Utah Construction Com-

pany south of Tucson, Arizona. These 41-yard-heaped-capacity scrapers are pulled by 500-horsepower M-R-S "Special" tractors.

New Open-Pit Mines

Stripping overburden is underway on a round-the-clock basis at the new open-pit mine of PIMA MINING COMPANY in the Mineral Hill mining district south of Tucson, Arizona. Utah Construction Company, one of the three major owners of Pima, is doing the stripping. The other owners are Union Oil Company of California and Cyprus Mines Corporation. Utah will strip some 200 feet of alluvium and caliche before reaching bedrock. The uppermost 50 feet of bedrock is barren and leached and is underlain by about 50 feet of oxidized copper ore which, in turn, is underlain by the primary sulphide ore.

The Pima ore body was discovered by geological and geophysical methods in 1951. The apex of the ore body is buried by 225 feet of alluvium. Surface and underground drilling plus over 7,000 feet of underground work proved a high-grade zone surrounded by a halo of low-grade ore.

While stripping is being rushed as fast as possible, a 3,000-ton-daily-capacity flotation mill has been designed for immediate construction. First production is targeted for late this year.



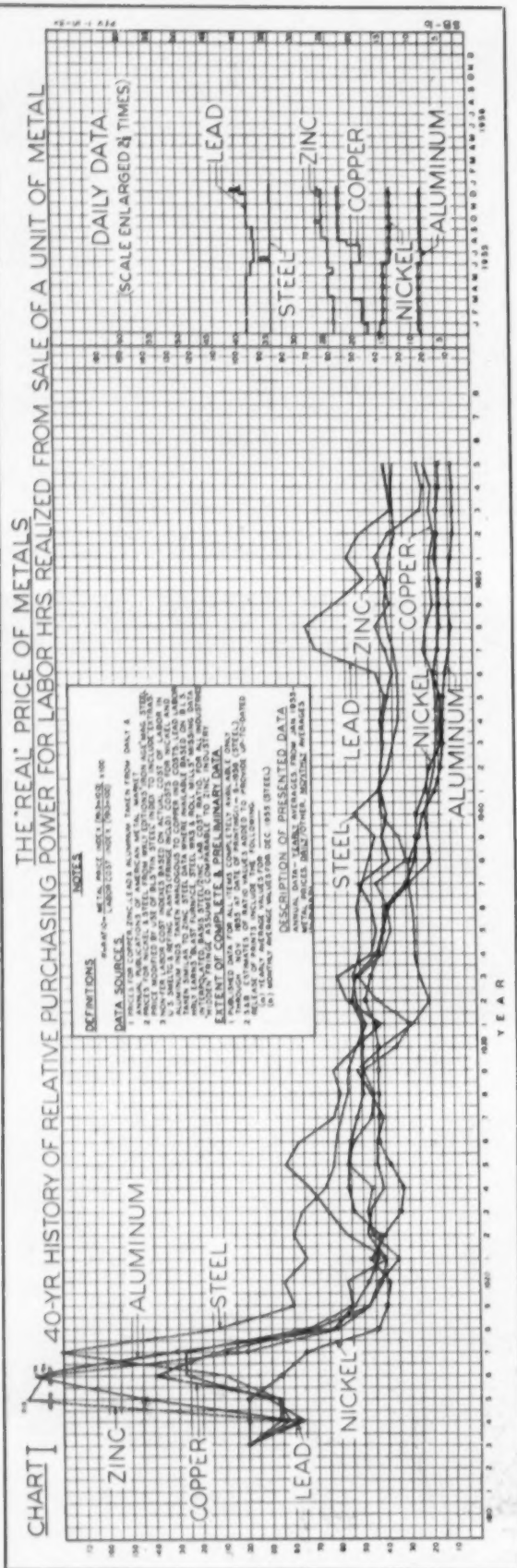
NO SLOW DOWNS AT NIGHT at the Pima stripping job of Utah Construction Company. This picture shows how the shovel's lights permit efficient loading on a round-the-clock basis. Day-in-and-day-out.



EUCLID TRUCKS loaded by Marion electric shovel move 200 feet of overburden at Arizona's newest open pit copper mine.



TWO CRAWLER TRACTORS pushing in tandem help load this Woolridge M-R-S scraper in the bottom of the new pit.



Labor Hours: A True



FRANK G. BREYER

Mr. Breyer, a senior member of Singmaster & Breyer, internationally known metallurgical and chemical process engineers with headquarters in New York City, presented this report at the Colorado Mining Association's convention in Denver, Colorado on February 3, 1956.

Long a student of metal economics, Mr. Breyer adds an important factor to production costs which has largely been overlooked, that is, the correlation of the purchasing power of a pound of metal with the number of labor hours it will actually buy on today's market. His findings are startling! Keep this report and take time to study it as he suggests. It will prove well worth every base metal producer's time and efforts.—Ed.

My preparation of this report, and your patience in reading it, will be justified in proportion to the degree that I can make the following points stick in your memories:

1. That alleviation of the United States nonferrous metal mining industry's present distress can be had only through political action directed at the federal government.

2. That there is no factual basis for assuming even a short term plateau, much less a declination in the world-wide inflation spiral. For you and me, the best measure of inflation is the cost of the consumed labor hour or the cost of new plant and production facilities.

3. That thinking in our field is much clarified if prices, whether for ore, concentrates, or for metal, are calculated and charted in terms of their purchasing power for labor hours as well as in cents or dollars. Ninety percent of all costs, direct and indirect, are for the consumed labor hours required for production. In the case of metals, mining and concentrating is, of course, the first step in production.

4. That valid projections for future metal economies are good in proportion as the data back of the projections cover the entire period of the inflation from 1913-1914 to date, and in proportion as they portray the heavy tonnage metals as a unit and relate them one to another.

5. Mineral reserves in the ground, including oil, gas, and sulphur, have proven by and large to be excellent investments over the 41 years of the world-wide inflation and are likely to improve in the future.

I will start this discussion by referring to enlarged chart No. 1. It is the basis of my whole presentation. This chart, if understood (it takes time) and objectively interpreted, will tie my five points, which, at first look, appear disjointed, together into a meaningful whole.

This chart, embodying the findings of 10 or more years of continuous checking of records and statistics, shows the 41-year history of what you really get besides paper when you sell your ore, concentrates, or metal. Whether you get dollars, checks, or ledger credits (all paper) is merely a bookkeeping device. It is the purchasing power of that paper for labor hours that you have really exchanged your metal for, since, as I have said above, 90 percent of all costs are for labor, direct and indirect. The latter, indirect

Metal Price Gauge

labor, goes into the making, transportation, sales, and delivery of whatever you buy: coal, power, or supplies.

At the risk and with the consequence of crowding, I have put on this chart the real price history over the past 41 years of the six common and tonnage metals; namely, steel, copper, aluminum, zinc, lead, and nickel. They are put there together because the metal fabricating industry consumes them all. They are to a limited extent substitutable one for another and they are sold and bought in large tonnages by a limited number of sales managers and purchasing agents. They move pretty much together in response to the moves of the most common cost denominator (the cost of the consumed labor hour) and respond for the short term to a more or less common market place psychology.

I can only point out here a very few things about the chart and leave it with you with the suggestion that I have found it a very helpful and profitable study whenever I am in a mood for real concentration on the subject. It is no good for a surface dip.

The two striking things about the assembled curves on the chart are, first, the contrasts between the real price of metals in the first World War and in the second; the intervals from 1914 to 1918 on the one hand, and from 1941 to 1945 on the other. In the first World War, the selling price of the metals in cents and dollars out-paced the selling price for labor hours in a most astonishing way (see left hand side of chart). In consequence, the spread or profit money all went to the entrepreneurs of labor; the stockholders or producers.

In the second World War, with the government in complete control of the price of metals but not in control of the cost of labor hours, the selling price of the labor hour violently out-paced the selling price of the metals. Most of the money went to labor and taxes, and not to stockholders. If either now, or after further study, you fully appreciate what I have said and agree as to what the chart reveals, you will understand very easily why the prices of metals had to drop after the first World War and why they had to rise after the second one.

Further you will have to agree with me that action by the federal government in the case of the second World War was effective. Whether you like the effect is beside the question. It was effective in stabilizing the market and getting money with which to pay high miners' wages. Many ways for alleviating the present distress of the Western miner have been proposed and are open for debate, but I suggest that it is very difficult, if you are a realist, to overlook the fact that the federal government did a good job of control once and presumably could do it again. The first support for my point one is the above argument.

The second striking thing about these curves is that they all run downhill from the left hand side of the chart to the right hand side of the chart. That means that you have been getting less and less labor hours for the paper money that you get for a ton of metal each year. In other words the real trading power of your commodity has been steadily declining since the end of the first war. It has declined to the point where the spread and profits are so low that management has little surplus with which to buy and construct new units of production. It has to borrow the money—and where does it get the money? It gets it where labor (white collar and shirt sleeve), who got most of it the week after you took it in, put it and is continuing to put it, namely, in the savings banks, the

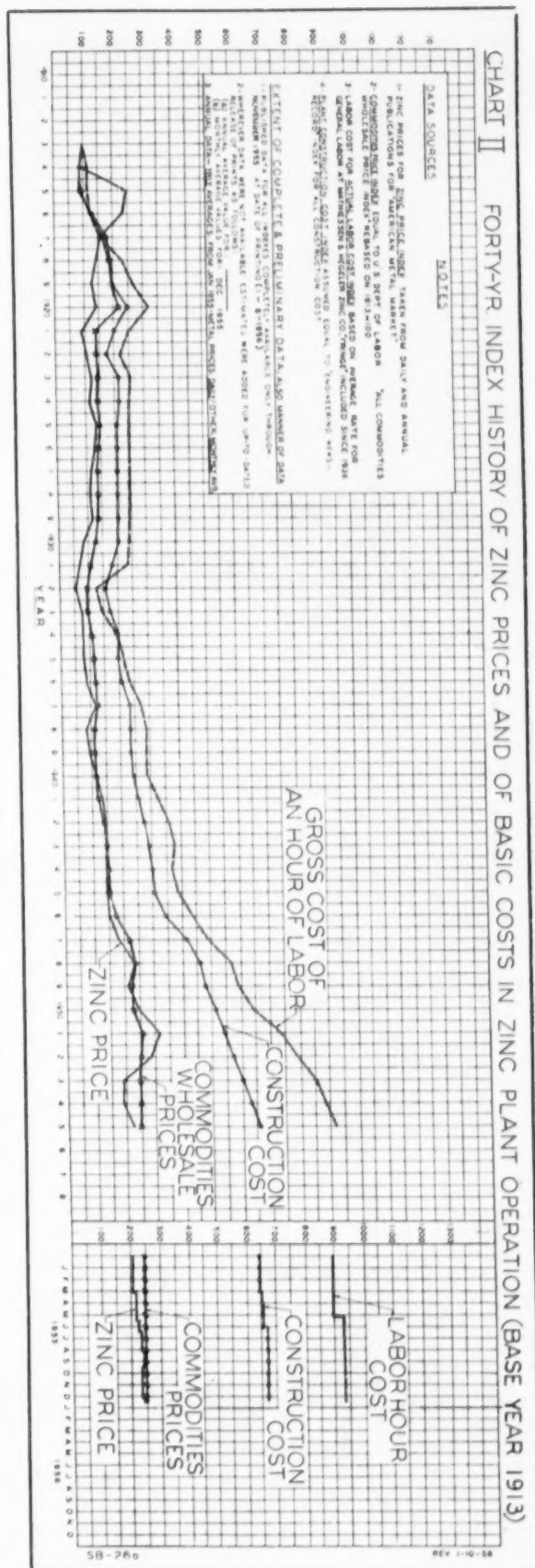
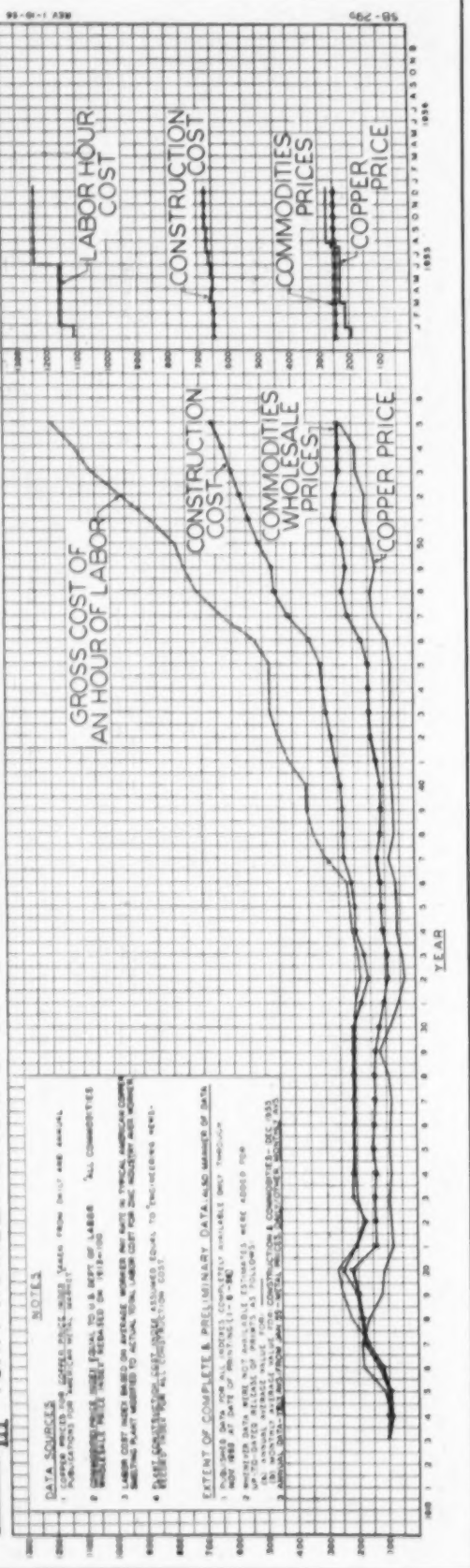


CHART III FORTY-YR. INDEX HISTORY OF COPPER PRICES AND OF BASIC COSTS IN COPPER PLANT OPERATION (BASE YEAR 1913)



insurance companies, trust and pension funds, and finally in labor's own union fund accumulations (a \$500,000,000 per year take for United States and Canada unions).

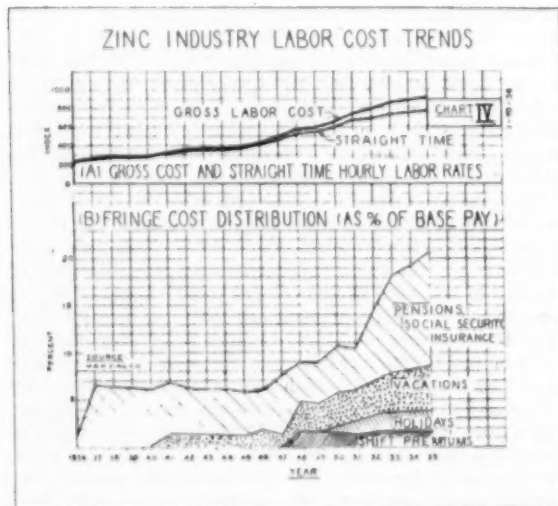
To go back and be precise about how the real trading value of a ton of zinc, for example, has steadily declined, let me give you the exact figures. The amount of zinc that would have bought you 33 labor hours in 1915 will buy you only between five and six labor hours today. In 1951, it would have bought you 12 labor hours, in 1933 17 labor hours, and in 1925 19 labor hours. This range of real returns is not materially different for any of the other common metals. They differ only in a minor degree. It is obvious that you cannot continue this decline in real purchasing power indefinitely. Technological development (a costly and hazardous business) resulting in the consumption of less labor hours per ton of production has helped and will continue to help in the future, but in my opinion political action is essential if the small, medium, and/or marginal producer who has no men or money to spend in research is to be kept alive. That insurance money, savings bank, or trust fund money is not for him. It is only available for the well established producers with a good credit rating.

Let us look at Chart No. II to make this point still clearer because it is extremely important to any real understanding of your situation.

Chart No. II shows graphically the 41-year history of the basic factors in zinc smelting economy. I have determined by spot checking with several companies that these same factors determine the economy of mining and milling operations as well. The first look at the chart shows immediately that over the years the selling price of labor hours has out-paced the selling price of zinc metal by almost four to one. In response to the greater supply of money and credit as compared to the supply of zinc (inflation), the price of metal has risen about 2½ times over the 41-year period, roughly from 5-6¢ to 12-14¢. The cost of the consumed labor hour, however, has risen roughly 10 times, from between 15¢ and 25¢ an hour to \$1.75 to \$2.75 an hour. These are total costs including fringe benefits, the make-up and magnitude of which latter I will show later.

To stay in business you not only have to meet the steadily rising payroll, but you have to make enlargements

Continued on page 82



Can An Import Tax Solve U.S. Mining Problems?



ANDREW FLETCHER
President, St. Joseph Lead Company

In the preceding article Mr. Breyer has clearly and convincingly proven the fact that the real value of metals has not kept pace with their true costs of production. This is especially true in the United States.

In the article below Mr. Fletcher points out the domestic miners problem of steadily rising costs, offers several solutions, and recommends a long-range program to protect domestic miners against ruinous floods of unneeded, yet imported, foreign metals.—ED.

The domestic mining industry is faced with the unpalatable fact that metals and minerals can, in general, be produced for sale more cheaply outside the United States than inside.

Two years ago, we were all greatly concerned with finding a solution to the immediate problems of the domestic mining industry; the lead-zinc branch of it in particular. Although an emergency solution was later reached in the form of the current stockpiling program, I hope no one believes that the problems of domestic mining have all been solved. Actually they have only been concealed temporarily, not eliminated, and their resolution for better or worse should not be postponed.

The problem is simply stated. Domestic miners are faced with steadily rising costs, the major elements of which are almost beyond their control. They cannot raise prices too high or they will encourage their competitors in other materials. They cannot

sell as low as foreign producers can, because their lower grades of ore and higher wage scales make it impossible. The domestic producer cannot completely satisfy the domestic market, except when demand drops seriously. That is why excessive demands abroad can force domestic prices abnormally high, as they did after Korea in 1951, and excessive supplies abroad can force our markets down to a non-profit level for many producers, as they did in 1953. Domestic producers were powerless in both instances, and all they ask is a measure of protection should either situation occur again.

Basic Considerations

Our past experience in studying solutions for mining industry problems makes it clear that if a program can be supported by everyone—producers, consumers, and the government—its chances of succeeding are enormously improved. Any course of action we recommend must consider government foreign policy and the needs of domestic consumers, as well as the immediate problems of domestic miners. Is it possible to reconcile these seemingly conflicting interests? To put it quite simply, I do not believe that there can be much choice. We can reconcile these points of view because we have to in the best interests of all concerned.

Tariffs Politically Unsound

What is the best solution for stabilizing the uncertainties of mining? The simplest and most obvious

method, of course, is a moderate increase in tariffs on imported metals to equalize this disparity in domestic and foreign costs. Unfortunately, the political situation is such that whether under a Republican or a Democratic administration it seems unlikely to achieve such tariff increases. In short, a moderate increase in tariff appeals to me as meeting the requirements of effectiveness, automatic operation, and fairness, but because of the present political climate, I am afraid one must regard it as unfeasible.

The free trader's answer to the problem is, of course, to eliminate tariffs, encourage imports of metals, and pay subsidies to any domestic miners who are injured as a result. Subsidies usually lead to stockpiling of surplus metals; they obviously burden the taxpayer; and they inevitably lead to government control of prices and production. Subsidies fail on the points of effectiveness, fairness, automatic action, and feasibility.

Imports Quotas Unwieldy

If one could trust implicitly in the wisdom and speed of some governing body that would constantly and equitably adjust import quotas to just the amounts needed by domestic consumers in excess of domestic production—but no more than that—one could advocate a quota system with some enthusiasm. I can believe that quotas on the fairly simple importation of metals might be feasible, but the problem of establishing quotas on concentrate imports becomes very complex, owing to

wide variation in grades and content of impurities. I am afraid that quotas for metals, ores, and concentrates, however earnestly they were handled, would be adjusted either too much, too little, or too late.

An Import Tax

As each of the foregoing methods is either politically or "practically" unsatisfactory, we can turn to another method that has been partially applied to copper imports. That is simply an import tax that would be applied automatically to imported metals whenever the domestic price for a calendar month averaged lower than a certain base level. The lengthy discussions of a sliding-scale import tax are probably

still fresh in the minds of many readers. I still think that the sliding-scale tax, as originally conceived, had much merit. However, for simplicity's sake, let us confine this discussion to the plain, fixed-unit import tax somewhat similar to that now existing for copper. This is how it would work in the case of lead and zinc.

A tax of 2¢ a pound would be applied to imported lead and zinc whenever the United States prices averaged below a so-called mobilization base level, which level might well be established initially by the Department of the Interior, possibly working with the Industry Advisory Lead and Zinc Committees and consumer representatives. If 1956 does not bring new

wage, freight, and other cost increases to non-ferrous metal producers, this base level might be set at lower than present market prices. The tax on concentrates would be 75 percent of that on metal, and on all imports it would probably be practical to consider the date of the bill of lading as the date for determining whether or not an import tax were due. If prices rose again and averaged higher than the base levels for a month, the tax would be suspended. There would be no sliding-scale feature, and the proceeds of this tax would go into the United States Treasury.

What Tax Would Do

What would this tax do for the domestic miners? It would solve their primary problem, the ironing out of the cost advantage enjoyed by foreign producers when the market price is below the mobilization base. Beyond that, this tax would tend to stabilize markets at about the base levels chosen because it would serve as an approximate ceiling as well as a floor. Thus there would be a tendency to end the boom-and-bust cycles of the last decade. These effects of the import tax would be of tremendous help to the majority of United States lead and zinc miners—but how would domestic consumers benefit? The United States consumers would benefit financially through stable metal prices, because the tax would help bring this about. Beyond that, they would enjoy a steadier and more reliable source of metals in a flourishing domestic mining industry that would not, like the foreign producers, be inclined to seek the better markets.

How would foreign producers be affected? One would hardly expect foreign producers to be enthusiastic about the import tax, but at least they could take comfort in the fact that of all the devices the United States might adopt to insure a healthy domestic mining industry, this import tax is the least troublesome to them, except possibly a direct subsidy to domestic miners, or an indefinite continuation of stockpiling. There would be nothing but the present minor tariff on imported metals as long as prices were high enough to sustain domestic production. Foreign producers can hardly quarrel with that situation. When prices fell, the 2¢ tax would act to discourage excessive imports that could only drive prices lower for all producers. After all, a healthy mining industry in the United States is quite as essential a defense measure for other nations of the free world as it is for the United States. The import tax is a way of minimizing the inconvenience to other nations while we pro-

Consumer's Big Stake In Domestic Mining

Imagine for a moment the result of following the free trader's suggestion of buying metals wherever they could be obtained at the cheapest price. Production of metals would be stimulated abroad, and would decline in the United States because of higher operating costs. Only the lowest-cost domestic producers could survive. Mining's labor force, as well as its know-how would also decline. But some manufacturers might view all this with equanimity because, after all, they would be getting metals from abroad at low prices.

Sooner or later, however, demand for metals such as lead and zinc would inevitably rise beyond the capacity of foreign producers alone to meet. Such a condition of world-wide scarcity could even happen almost overnight, as has recently happened in the copper industry. The simple force of world industrial growth will be enough to bring this about. This situation would obviously result in competitive bidding for available supplies, and, in turn skyrocketing prices. Manufacturers in the United States would turn accusingly once more to domestic metal miners and call for help, just as they have done in past war years. But the next time there would be few to answer the call. It would take months, or years, to bring production back to anything like necessary levels. In the meantime, prices of lead or zinc or copper could and would climb beyond any levels they have hitherto reached.

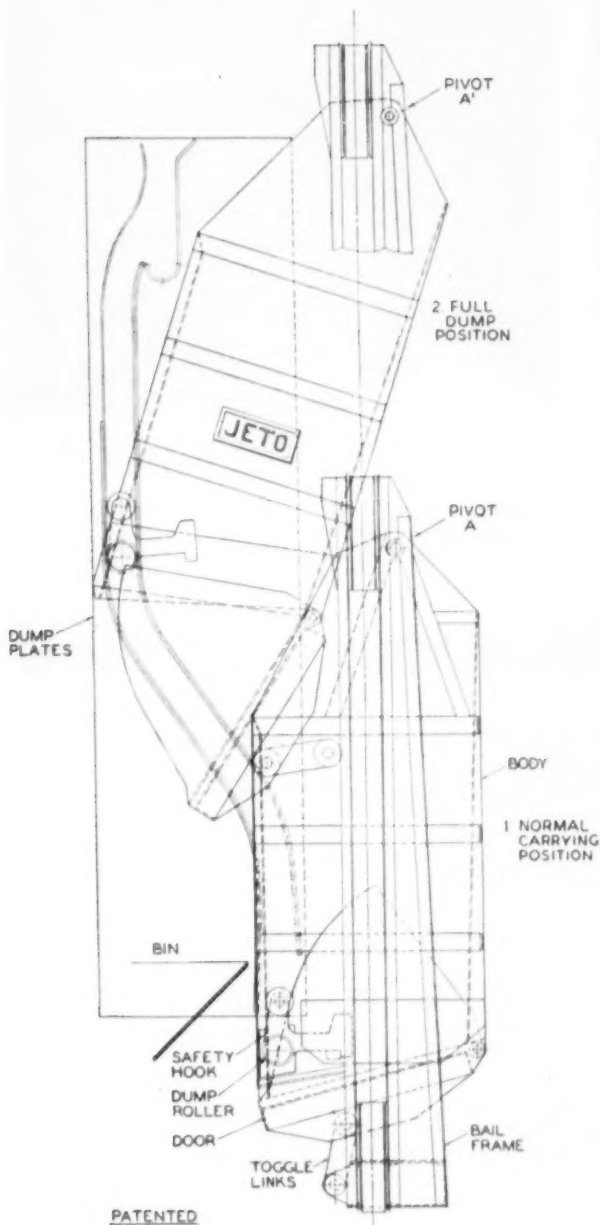
Certain programs for maintaining the domestic mining industry have been offered in the past, but met their opposition on the part of consumers largely because the consumers weren't convinced that the programs would actually save them money in the long run. The consumer belongs on the miner's side; it is up to us to show him why.

The best light in which a consumer should view what has happened in lead and zinc, is the simple one of cost to himself. Between 1948 and 1952, lead and zinc went through a cycle of dropping, rising and dropping prices. A consumer who regularly bought 50 tons of each metal per month during this period paid \$968,034 for his lead and \$885,765 for his zinc. If there had been a steady market all that time at 15 cents for lead and 13 cents for zinc, he would have paid \$900,000 for the lead and only \$780,000 for the zinc. In other words, stable markets, even at prices that a consumer would have regarded as fairly high, would have saved him nearly \$174,000 or about 10 percent.

This example was not hand picked over a favorable span of time. In the period 1950 to 1954, the consumer would have spent \$897,656 for 50 tons of lead per month and \$835,408 for 50 tons of zinc. At a straight price of 15 cents for lead and 13 cents for zinc, he would have spent more for lead, but his savings in zinc would have put him \$53,000 ahead.

In the foregoing calculations, I assumed stable prices of 15 cents for lead and 13 cents for zinc because they seemed to strike a balance between levels that many consumers thought too high and levels that many in the mining industry thought too low. Actually with wage increases granted in 1955, plus probable further cost increases in 1956, the consumer should begin to think in terms of generally higher prices for all metals if the domestic mining industry is to be maintained on a profitable basis.

Lake Shore's "JETO" bottom dump skip dumps 20% faster — HERE'S HOW IT WORKS



This engineer's drawing shows Lake Shore's "Jeto" bottom dump skip; 1. in normal carrying position, 2. in full dump position. The skip body swings outward from the bail frame on pivot point "A" while toggle links open the bottom door.

How the "Jeto" skip is made

The two principal parts of Lake Shore's "Jeto" bottom dump skip are the bail frame and the body of the skip. They move vertically in the shaft guides. When the dump position is reached, the body swings out and the ore is jetisoned. The dumping mechanism consists of a pair of dump plates (or scrolls) mounted at the dumping station, and dumping rollers, safety hook rollers, toggle door release links, all mounted on the skip.

How it works

As the loaded skip moves into the scrolls, the safety hooks unlock the body from the bail frame, the dump rollers swing the body outward. With the outward movement of the body, toggle links attached to the skip door and the bail frame open the skip door and the ore is dumped. In full dump position, the door is in line with the back of the skip body, and the ore flows unrestricted from the skip. When the skip moves down, the same mechanism closes the door and swings the skip body back into the bail frame.

Why the "Jeto" reduces ore handling costs

"Jeto's" bottom dump is 20% faster than a Kimberly, means more skip loads per day.

Sticky ore dumps clean every time.

Full weight of skip is on the rope at all times —improves hoisting balance.

Positive door action prevents accidental dumping—safety hooks keep body locked in bail frame until dumping station is reached.

When planning to replace a skip or to sink a new shaft, talk to the people at Lake Shore: Find out how the "Jeto" can reduce ore handling costs in your operation.

LAKE SHORE, Inc.

Lake Shore Engineering Division
IRON MOUNTAIN 1, MICHIGAN



GOLD, SILVER, AND URANIUM banquet drew a host of notables from all parts of the country. Many are at head table shown above.

SOWBELLY SERENADE brought laughs to Charlie Steen's burro and various uranium prospectors at the famed Sowbelly dinner.

Colorado Convention Hears of New

The 59th annual convention of the Colorado Mining Association at its National Western Minerals Conference in Denver, Colorado early in February brought out two most important uranium facts:

There is no question but that domestic ore reserves are very large and growing fast.

There is and will be an accelerated program by all to mine these reserves before the announced termination of the United States Atomic Energy Commission's domestic ore buying program on March 31, 1962.

By correlating and interpreting the 40 odd reports and papers given on uranium at the meeting, it appears that domestic ore reserves were practically doubled in 1955. For the first time the true magnitude and significance of the Ambrosia Lake District north of Grants, New Mexico was revealed to the mining industry. Highlights of this area follow. Other important reserves were added at Crooks Gap, Gas Hills, and other Wyoming districts; in Moffatt and Gunnison

counties, Colorado; and in two districts near Spokane, Washington.

The more than 2,500 miners at the convention all knew that the year's most significant uranium statement would be made on the last day of the convention, February 4th. This would be the report on the domestic uranium market by Jesse C. Johnson, director, Division of Raw Materials, United States Atomic Energy Commission. As Mitchell Melich, secretary of the Utex Exploration Company, Moab, Utah introduced Mr. Johnson you could feel the high tension and keen interest of the thousands in the vast hall. Reporters were posed to race for telephones; stock brokers had their runners at hand, despite the fact that most markets were closed on Saturday; and the prospectors and miners—from 20 states and from one-man operators to giant corporations—waited with absolute silence.

Mr. Johnson knew the importance of the time, the place, and the crowd. He gave the report in his first sentence as he said "What is going to happen after March 31, 1962? Will there be an AEC uranium procurement program, and, if so, what kind? I am sorry, I do not have the answer."

The silence lasted only a second as the stunned crowd reacted. A faint cry from a woman, a whistle of surprise, a ripple of sighs, exclamations, and a steady murmur of comments as each spoke to his partner. It lasted only a minute as Mr. Johnson never deviated from his prepared text and spoke on to his attentive audience.

In talking later to major and minor uranium producers the impression was that Mr. Johnson had hoped to the last minute to have a more favorable report. He has done everything possible to call to the Commission's attention the importance of a still longer range program. The McKinney Report (See Fission Facts page 63) on the Peaceful Uses of Atomic Energy for the Joint Congressional Committee on Atomic Energy issued on January 30 must have had a very important bearing on Mr. Johnson's report. The McKinney Report can and undoubtedly will have a still greater impact on the domestic mining industry.

Ambrosia Lake Discoveries

Atomic Energy Commission geologists J. Gabelman, W. Young, and G.



ANDREW FLETCHER, president of St. Joseph Lead Company, outlines methods to maintain a healthy domestic mining industry.

DANCING GIRLS are as big an attraction for the uranium miners of today as they were for the gold prospectors of yesterday.



U₃O₈ Discoveries And Growing Uses

Ely reported on the Exploration Activities of the AEC in The Ambrosia Lake Area north of Grants, New Mexico.

Since April 1955 when the first ore-grade uranium was discovered in cuttings from an old, dry hole drilled for oil in the Ambrosia Lake district, a major uranium boom paralleling that at Moab, Utah has been underway.

The uranium does not crop out, but the uranium bearing beds are buried from several hundred to almost a thousand feet (west of the fault in the western section). Of necessity all discovery has been by drilling, but the combined results of hundreds of holes drilled by more than 70 rigs at one time have indicated reserves in the millions of tons. Ore-grade thicknesses, in places, have been more than 100 feet. Average grade indicated is between 0.25 and 0.30 percent U₃O₈.

Uranium in commercial concentrations has been discovered in Sections 10, 11, 12, 13, 15, 22, 23, 24, 25, and 26, T. 14 N., R. 10 W. Uranium is found in the Westwater member of the Morrison formation around the flanks of a dome with 500 feet of clo-

sure. Postulated geological history is: Folding of sedimentary beds, trapping of oil, northeast trending faults formed, flushing of oil from reservoirs, entrance of ore solutions into oil traps, and tension faulting.

Wyoming U₃O₈ To Fore

Uranium in Tertiary sediments in Wyoming has led to low costs and easy mining because early discoveries cropped out or were covered by little or no overburden, reported Ray Lindlof, geologist for the Denver Exploration Branch of the United States Atomic Energy Commission. He then went on to tell of deeper drilling which recently had indicated very important deposits in the following districts: CROOKS GAP, six of 10 widely spaced holes hit ore-grade uranium in the Wasatch formation at depths to 470 feet. GAS HILLS, ore has been found by drilling at depths to 325 feet. MONUMENT HILL, ore at depth has been found in the Wasatch formation. Other areas worthy of more prospecting are: Baggs, Copper Mountain, Pumpkin Buttes, Kitchen Buttes,

Sand Draw, and Sheep Mountain, he added.

True Cost of Mining

In a special panel on costs and true value of metals, Frank G. Breyer, Singmaster and Breyer, New York City; Andrew Fletcher, St. Joseph Lead Company, New York City; and O. A. Rockwell, The Eagle-Picher Company, Miami, Oklahoma, told what true costs were, what the domestic miner could do about them, and how Tri-State operators had been able to keep mining only because of greater efficiency. So significant and important are the papers of Mr. Breyer, and Mr. Fletcher to the entire mining industry that MINING WORLD has arranged to print both of them in this issue starting on page 46.

Mr. Rockwell said "... it seems quite evident that the Tri-State field must have a price of about 12.5 cents per pound for zinc combined with a lead price of 15.0 cents to break even. ... It is my firm belief that the great increase in foreign concentrates and slab zinc imports have created a domestic price situation that must be corrected immediately if the domestic

zinc mining industry is to remain healthy."

No Need For Secrecy

Two speakers—Simon S. Strauss, vice president of the American Smelting and Refining Company, New York City, and Jesse Johnson of the AEC—attacked government secrecy on mining and minerals. At the world-famed Gold, Silver, and Uranium Banquet, Mr. Strauss said that the government could afford to, and should, disclose stockpile details, and that it was foolish to keep such information secret when the government regularly announced manpower figures in the armed forces, revealed details of the latest jet fighters, and permitted reports and pictures of the atomic-powered submarine *Nautilus*. He further pointed out the danger to the domestic miner in the program of the Agriculture Surplus Disposal Agency which is using agriculturists to deal in metal and mineral barter. He recommended that legislation be passed to insure revelation of all details when barter agreements are made, to permit the domestic producer to be considered in such deals, and that unless there is room in the military stockpile that there is NO NEED for any barter deals.

Mr. Johnson said that "uranium statistics probably are no longer as im-

Elect New Officers

M. P. Cloonan, Ozark-Mahoning Company, Cowdrey, Colorado, was elected president of the Colorado Mining Association at its 59th convention in Denver, Colorado on February 2, 1956. Vice presidents are G. T. Rummel, La Salle Mining Company, Grand Junction; Max W. Bowen, Golden Cycle Corporation, Cripple Creek; W. E. Burlison, Garfield Lease; Salida; D. W. Viles, Vanadium Corporation of America, Durango; and Frank Coolbaugh, Climax Molybdenum Company, Climax. H. W. C. Prommel, consulting engineer, Denver was reelected treasurer, and Robert S. Palmer, reelected executive vice president.

portant from a security standpoint as in the past, and the time may be approaching when this information can be declassified."

Optimistic Uranium Outlook

One of the most optimistic reports on future consumption of uranium ever given the mining industry was by Henry C. Anderson, manager, Product Planning and Development, Atomic Power Equipment Department, General Electric Company, Schenectady, New York. Under the most favorable conditions he saw a consumption of 381 tons of natural uranium in central power plants in 1960, 800 tons per year by 1965; 4,700 in 1970, and

22,150 tons in 1975. In 1975 this would mean mining 9,000,000 tons of 0.30 percent U_3O_8 ore.

Tungsten Situation Today

An up-to-the-minute report on the domestic tungsten program was given by Blair Burwell, president, Minerals Engineering Company, Grand Junction, Colorado. He reported that deliveries to the government's stockpile in 1955 were 919,051 units compared with 860,158 in 1954, but that last half 1955 deliveries were less than for the last half of 1954. On the consumption side he said, "Domestic consumption of tungsten showed a substantial increase, but not in proportion to domestic production. Domestic production exceeded domestic consumption in 1955 for the first time in the history of the industry. In spite of purchases abroad for stockpiling in the United States imports were over 3,000,000 pounds less than in 1954."

Truth About Silver

At the Silver Session, E. O. Sowerwine, vice president of the Anaconda Company, New York City, said that the testimony of W. Randolph Burgess, Under Secretary of the Treasury, at a Congressional silver hearing last year "should furnish sufficient guarantee to prevent passage of S. 1427 or any similar proposal that may be made in future sessions of Congress." Mr. Burgess said at the hearing that the silver is purchased with silver certificates so it doesn't cost us anything. On the contrary we made seigniorage. Otherwise, for the government to acquire any of that money, it would have to raise taxes.

Pace Setter Meeting

Of necessity only the highlights of this large and important meeting can be given here. With 93 speakers covering the entire mining industry in all its technological, economic, and political phases, in three separate yet simultaneous capacity crowded sessions, there was more happening than at any other previous convention. As one operator said, "There's everything from aluminum by Anaconda to zirconium for Atomic Energy Reactors so I tell my staff members to attend those sessions in which they are most interested. They can't go wrong because each will learn something of importance to do his job better."

Once again the Colorado Mining Association, through the hard work of its members and untiring committee men, has set the pace and theme for the rest of the year's mining meetings and exhibitions.



CHARLIE STEEN, the most famous prospector of the 20th century, who really started the uranium boom, and his burro "Atomic" symbol of yesterday's prospector.

.....Headliners At Colorado Convention



A. O. LUNDQUIST, Union Carbide, introduced Dr. N. E. Berry, Mallinckrodt Chemicals.



DU PONT POWDER was represented by F. W. Parrott and C. L. Barker from Denver.



D. W. VILES, general chairman (right), and M. G. McGrath—both know uranium—from mine to mill.



CHARLES STEEN mines uranium and Hon. Harold E. Stassen, assistant to the President on disarmament, tells him its future in peaceful world at Sowbelly Dinner.



WHAT HAPPENS after March 31, 1962 remained unanswered by Jesse Johnson.



HARRY L. McNEILL, convention vice chairman, lined up a great technical program.



DAN SOBRAL from far off Chile, South America tells two Atomic Energy Commission geologists about uranium there. They are: John Gabelman and Les Wahl.



MACHINERY EXPOSITION completely filled the giant transportation building at Denver's new Mile High Center. This is general view of a few exhibits.



OREMASTER GEIGER COUNTER HAT is what the well dressed prospector wears today.

MAGMA COPPER COMPANY

Buyers of

**COPPER, GOLD
AND SILVER ORES**

**MINES AND SMELTER AT
SUPERIOR, ARIZONA**

BUNKER HILL & SULLIVAN MINING AND CONCENTRATING CO.

Mines and Smelter at Kellogg, Idaho

Buyers of:

Lead ores and concentrates, zinc concentrates, silicious gold ores.

Sellers of:

"BUNKER HILL" brand of refined Pig Lead, Slab Zinc, Cadmium crude Antimonial Lead and Leaded Zinc Oxide.

We are proud of our "BUNKER HILL" trade mark. It represents the highest quality of metals produced. We likewise strive to make "BUNKER HILL" known as a symbol of the highest quality in our relations with our employees, with our suppliers of ores and concentrates, with our stockholders and with the general public.

For information regarding ore rates and shipments
Address:

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Box 29
Kellogg, Idaho**

International Smelting and Refining Co.



Buyers of

Copper, Silver & Gold
Ores and Concentrates:

Copper Smelter—Miami, Arizona
Address: Ore Purchasing Department
International Smelting and Refining Co.
P. O. Box 1265
Miami, Arizona

Lead & Zinc Ores
and Concentrates

Lead and Lead-Zinc Smelter }
Lead-Zinc Concentrator } Tooele, Utah

Address: Ore Purchasing Department

International Smelting and Refining Co.

818 Kearns Building
Salt Lake City, Utah

Please establish contact prior to shipment.

AMERICAN ZINC, LEAD AND SMELTING COMPANY

Buyers of Zinc Concentrates
Suitable for Smelting in Retort
and Electrolytic Smelting
Plants, also Buyers of High
Grade Lead Concentrates.

Address Communications to Ore Buying
Department

Paul Brown Building
ST. LOUIS, MISSOURI

423 Mills Bldg.
EL PASO, TEXAS

927 Old National
Bank Building
SPOKANE, WASHINGTON

P.O. BOX 577
DUMAS, TEXAS

United States

Personalities in the News

Ellis H. Gates has joined Manganese, Inc. at Henderson, Nevada, as chief metallurgist. Mr. Gates has previously held positions at Cerro de Pasco Corporation in Peru, Kennecott Copper Corporation in Salt Lake City, and Metallics Recovery Corporation in Colorado.

Charles Dandois has been appointed assistant kiln superintendent at Manganese, Inc. in Henderson, Nevada. He most recently was with Lake Valley Manganese, a subsidiary of Haile Mines, as is Manganese, Inc. Before that, Mr. Dandois was concentrator superintendent for Cerro de Pasco and metallurgist for Compagnie Aramayo de Mines in Bolivia.

William O'Kelley, chief mining engineer for Anaconda Company in Butte, Montana for the last 20 years, has retired and moved to California. His successor will be **Fred W. Strandberg**, assistant chief mining engineer, who will be replaced by **Robert Davison Piper**.

Dennis E. Leary has been appointed superintendent of the Washoe Sampler of The Anaconda Company at Butte, Montana. He succeeds the late **L. R. Margetts**.

Roger Moen has joined the engineering department of the Minnesota Ore division of the Jones & Laughlin Steel Corporation at Virginia, Minnesota. He was formerly with the Homestake Mining Company, Lead, South Dakota.

Francis B. Speaker, engineer for Hewitt-Robins, Incorporated at Stamford, Connecticut, has been appointed consultant on mining matters in the Office of Minerals Mobilization. Mr. Speaker was chief of the Non-Ferrous Metals Division of the War Production Board during World War II and director of the Mining Division of the Defense Materials Agency during the Korean conflict.

Paul E. Melancon, chief of the geological division of Holly Uranium Corporation, New Mexico, has been appointed general manager of the Gila County, Arizona properties of The American Fiber Corporation of Globe, Arizona. American Fiber is a recently acquired subsidiary of Holly Uranium. Mr. Melancon is also general manager of the Lea Exploration Company, a division of Holly Uranium, operating the Mesa Top Mine in the area of Grants, New Mexico.

DR. THOMAS B. NOLAN, right, has been appointed director of the U. S. Geological Survey succeeding **DR. WILLIAM E. WRATHER**, who is retiring. Dr. Nolan, who holds degrees from Yale University, began his Civil Service career as a junior geologist in 1924. He mapped several mining districts in Utah and Nevada in his early years with the Survey, and later organized studies of all tungsten deposits in the United States. He has been assistant director of the Geological Survey since 1944.



NEED FOR IRON ORE BENEFICIATION



"Until recently most blast furnace operators have been well satisfied with iron ores which averaged about 50 per cent Fe, 10 to 11 per cent silica, and with other elements in correct proportion. With the advent of beneficiating processes for improving iron ore quality, together with the use of higher grade foreign ores, it has been found that the use of these better ores has resulted in a remarkable improvement in blast furnace operation with increased iron tonnage and lowered costs due to reduction of coke and limestone requirements. The following shows the benefits of improving the quality of iron ore burden. Starting with an iron ore containing 50 per cent Fe and 10.5 per cent silica and by beneficiation processes improving this ore so that it contains 54 per cent Fe and 8 silica, we estimate the following savings on the basis that any fines in the iron ore will be charged as sintered or agglomerated material: Iron production increased by about 13 per cent, coke rate reduced 200 pounds per ton, limestone reduced 250 pounds per ton. Assuming a basis of \$10.00 coke and \$2.00 limestone, the estimated savings would amount to approximately \$0.75 per ton of pig iron taking into account the savings in coke, limestone, "cost above," and allowing for the cost of producing sinter from the ore fines. From the above analysis it is our firm conviction that every effort must be made by the iron ore mining industry for research and development work so that economic processes can be developed for the beneficiation of the iron ores."

—**J. H. STRASSBURGER**, assistant vice president, Weirton Steel Company.

Gilbert R. Griswold, mining engineer, and **Peter C. Woods**, geologist, have joined the staff of Chapman and Wood, Albuquerque, New Mexico, consulting mining engineers and geologists.

D. M. Berry has taken over duties as safety engineer at the San Miguel Copper Corporation in Arizona. He leaves a position as safety engineer at Kennecott Copper Corporation's plant at Hurley, New Mexico.

H. C. Meyer has retired from his position as chairman of the board of Foote Mineral Company, Kings Mountain, North Carolina. During his 50 years of service, Mr. Meyer served as president of the company from 1936 until 1952 when he became chairman of the board. Foote is the foremost

producer of lithium and was the first company to produce commercial quantities of pure zirconium metal.

Bert A. Robbins has recently become general manager of the Chino Mines division of Kennecott Copper Corporation at Hurley, New Mexico. Mr. Robbins was formerly division controller at Chino and is succeeded by **Howard R. Miller**, formerly assistant controller. **Frank S. Hardy, Jr.** has transferred from Kennecott's Salt Lake City internal audit division to become administrative accountant at Chino.

Samuel S. Arentz, recently the manager of Combined Metals Reduction Company's Nevada operations, has announced the formation of Armet Company, a privately financed minerals exploration, development, and mining venture with offices in Salt Lake City, Utah. A graduate of the McKay School of Mines, University of Nevada, Mr. Arentz has served as resident manager of the Rico Argentine Mining Company at Rico, Colorado.

Houston Clark, administrative assistant at Potash Company of America, Carlsbad, New Mexico, has been named chairman of the Carlsbad section of the American Institute of Mining and Metallurgical Engineers. Others elected to offices by the group were **Douglas Bourne**, first vice chairman; **Tom Ferguson**, second vice chairman; and **Don Libbey**, secretary-treasurer.

Neil O. Johnson has been appointed plant manager of Foote Mineral Company's lithium ore operations at Kings Mountain, North Carolina. Mr. Johnson was formerly technical representative in the explosive department of E. I. DuPont de Nemours at Wilmington, Delaware.

Robert M. McGeorge, who was superintendent of the zinc plant of American Smelting and Refining Company's Selby smelter at San Francisco, has been named ore buyer and assistant to the manager of the company's plant at Garfield, Utah.

Tait E. Siebenthal, superintendent since 1947 of The M. A. Hanna Company Fillmore County iron mines near Spring Valley, Minnesota, has retired. He is succeeded by **Cyril A. Pedersen**.



F. H. STEWART, left, has been appointed manager of the mining and exploration department of The American Metal Company, Limited and will have headquarters in New York. **W. AUBREY SMITH**, right, succeeds Mr. Stewart as general manager of American Metal's subsidiary, Southwest Potash Corporation, Carlsbad, New Mexico. Mr. Smith was formerly assistant general manager of Southwest Potash.

formerly assistant superintendent, who has been with Hanna since 1950.

Ross W. Cummings is now director of information and public relations for Kerr-McGee Oil Industries, Inc. in Oklahoma City, Oklahoma. Mr. Cummings is a former WKY-TV newsmen and at one time was managing editor of the Holdenville Daily News in Oklahoma.

L. A. Norman, Jr. has resigned his position as supervising mining geologist with the California Bureau of Mines to join the staff of Equipment Engineers, Inc. in San Francisco, California.

Sidney S. Alderman, formerly geologist in Salt Lake City, Utah with the American Metal Company, Limited, has returned from minerals survey work in California to open Salt Lake City offices for the United Geophysical

Corporation which will serve clients in the Intermountain Area.

L. C. Binon, L.M. Sherman and R. Best, geologists of the Reynolds Metal Company in Little Rock, Arkansas, recently visited the Missouri lead belt to study the prospecting methods of St. Joseph Lead Company.

W. F. McDermott has resigned as superintendent of plants for W. S. Moore Company in Hibbing, Minnesota, to accept a similar position with Pickands Mather & Co. James Toepel, who left Pickands Mather in 1951 for a position in Iowa, has rejoined the company as metallurgist at the Erie Laboratory in Hibbing.

Obituaries

Carl J. Trauerman, 70, secretary-manager of the Mining Association of

Montana, died at his home in Butte Montana on December 17. Mr. Trauerman attended the Massachusetts Institute of Technology and then began his 50-year career as mining engineer, inventor, editor, and executive. In the last 30 years of his life, Mr. Trauerman was mainly concerned with the business, executive, and financial end of the mining industry, and also spoke before many committees and associations.

Harold V. Trask, chief metallurgist of the Cleveland Office of the Cleveland-Cliffs Iron Company, died in a Cleveland hospital on December 23. Mr. Trask held degrees from the University of North Dakota and the University of Utah. He had been associated with a number of mining firms, including Mountain City Copper Company of Utah, Talache Mines, Inc. of Utah, Butler Brothers, Minnesota, Buel Metals Company, Southwest Graphite Company, and Oglebay, Norton Company. His work at Cleveland-Cliffs began in 1952.

Sidney Estes Burleson, 81, mining engineer, died in Salida, Colorado on January 7. An active member of the Colorado Mining Association for a quarter of a century, Mr. Burleson worked mines extensively in Chaffee, Saguache, and Gunnison counties in Colorado for many years. In his early years he was associated with American Smelting and Refining Company at activities in El Oro, Mexico. Illness had forced him to retire from mining in 1950.

Leslie B. Manning, 58, general manager of the Trout Mining Division of American Machine and Metals Company, died at Philipsburg, Montana on December 25. After attending the Montana School of Mines, Mr. Manning joined the mining division of American Machine and Metals in 1926, and became manager of the division in 1945. He served as president, vice president, and delegate-at-large of the Montana Mining Association.

Joseph H. Hedges, former Bureau of Mines engineer, 73, died at a Washington, D. C. hospital on January 12. Mr. Hedges, who held degrees from Michigan State College and Michigan College of Mining and Technology, joined the Bureau of Mines in 1926 after experience with copper and silver mining in the United States, Canada, and Mexico. He was a special assistant in the Washington office until 1940 when he began a series of supervisory positions in Maryland, Arizona, New Mexico, and Texas. In 1949 he was recalled to Washington to serve as chief of the minerals division, and later became special assistant to the director, a post which he held until retirement in July 1955. Mr. Hedges held the Interior Department's highest honor, the Distinguished Service Award.

Hulett Clinton Merritt, 83, financier and industrialist, died at his Montecito, California estate, Far Afeld, on January 13. He was one of the early owners and developers of the Mesabi Iron Range in Minnesota and a director of the Merritt-Rockefeller syndicate which operated the Lake Superior Consolidated Iron Mines. When Merritt-Rockefeller sold its mining and railroad interests to U. S. Steel Corporation, Mr. Merritt became the principal stockholder in that corporation.

A Balanced Program for Improved Drilling

TEE CEE
(tungsten carbide insert bit)

LIDDICOAT
(used to destruction—no resharpening bit)

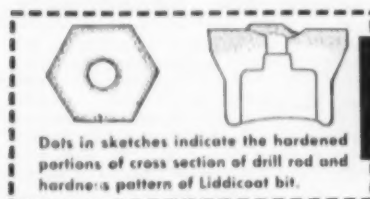
Carburized Drill Rod

To equal the fine drilling quality of Liddicoat bits, a drill rod has been developed to provide much greater footage and consequently lower cost per foot of hole drilled. The drill steel has been carburized to provide a stiff rod with a hardened section on the outside of the steel, and on the inside around the water hole. These hardened sections are supported by a strong ductile core.

Carburizing treatment has been designed to correct weaknesses existing in ordinary steel; namely, surface decarburization and low strength zones. By carburizing and hardening, tendency to fatigue failures, rapid wear in drill rods is lessened. The carburized rod incorporates mechanical and metallurgical refinements heretofore unavailable in drill steel.

$\frac{3}{8}$ " Hexagon is the most popular section for feed-leg drilling. To secure the advantages of this cross section of drill steel, the Liddicoat bit is made in type 3 TEE CEE, 3-L and 3-H — all have the same socket size. Within the socket are forged six flats to match the flats on the rod. The bits are all interchangeable, which provides a type of bit best suited to ground conditions.

A trial order will prove the merit of this balanced combination to your entire satisfaction.



WESTERN
Rock Bit Manufacturing Company
552 West 7th South • Salt Lake City 4, Utah

Newsmakers

in International Mining

ADIN A. BROWN (right) has been elected director and vice president in charge of mining operations of American Smelting and Refining Company. He succeeds R. F. GOODWIN who has retired and who plans to devote his time to Southern Peru Copper Corporation. Mr. Brown was formerly general manager of the Mexican Mining Department of American Smelting and Refining Company in El Paso, Texas. He is succeeded by C. F. JORDAN, formerly assistant manager.



R. F. Allen has retired from the mining engineering department of New Consolidated Gold Fields Ltd. and has joined Messrs. John Taylor & Sons, London, to carry on research work in the mining engineering department.

Charles E. Prior has left his position as resident engineer in the New York mining department of American Smelting & Refining Company to become consulting mining engineer to Western Gold and Uranium, Inc. and its subsidiary, Gold Crown Mining Company, with operations in Arizona and Utah. Mr. Prior was general manager for the Hercules Company in Mexico and Central America before joining American Smelting in 1947. Previously he was managing director for the Australian subsidiary of Consolidated Goldfields of South Africa, Ltd. and general superintendent for the Fresnillo Company in Mexico.

Frank V. C. Hewett, Toronto mining engineer, has been appointed general manager of McIntyre Porcupine Mines, effective March 1. Since graduation from the University of Toronto in 1933, Mr. Hewett has devoted his time to field exploration throughout Canada and mineral economics. He has served as Deputy Metals Controller in Ottawa, on United States-Canada raw materials joint committees, and as Director of Non-Ferrous Metals for the Dominion government.

John B. Hollister, director of the International Cooperation Administration, traveled to Latin American countries in February to meet with directors of U. S. operations missions carrying out technical and economic assistance. Accompanied by Rollin S. Atwood, ICA regional director for Latin America, he visited Brazil, Bolivia, Peru, Colombia, and Guatemala.

Takao Samakamoto, University of Tokyo professor of geology, is in Brazil studying the northern part of that country. Dr. Takao, who was commissioned by UNESCO, is regional vice-president of the American Economic Geologists in Asia.

P. H. A. Zaalberg has been promoted to managing director of the Billiton Company and has been transferred to the headoffice at The Hague, Holland. His successor as general manager of the Billiton Company Suriname is L. Tissot Van Patot.

Frank Elliot, who was chief mining engineer in Southern Rhodesia for many years, has been awarded membership of the Order of the British Empire in the New Year's Honours List. Cited was his guidance in development of the coal resources of Southern Rhodesia. Mr. Elliott now represents the Messina Transvaal Development Company in Salisbury, Southern Rhodesia.

Jesuino Felicissimo, Jr., mining engineer and president of Sociedade Brasileira de Geologia, is presently studying bauxite deposits in the Evangelista de Souza and Curucutu areas in the State of Sao Paulo.

D. R. de Vletter has resigned as geologist with the Nickel Processing Corporation, Nicaro, Cuba. Dr. de Vletter has joined the geological staff of the International Nickel Company of Canada and has headquarters at Copper Cliff, Ontario.

E. J. C. Douze, mining engineer, has moved from Buenos Aires, Argentina to Delft, Netherlands.

Charles William Smith, geologist with American Smelting and Refining Company's exploration division for eastern United States, is being transferred to Peru where he will be resident geologist at the Quirivilca unit of the Northern Peru Mining and Smelting Company.

Robert L. Akright, United States Atomic Energy Commission representative in Lima, Peru, has returned to the United States and is living in LaCrosse, Wisconsin.

Merle H. Guise, mining engineer, and Mrs. Guise are traveling in Spain and receive mail through American Express in Madrid.

Cornelis Bloot has joined the Corporación Minera de Bolivia as a block-caving engineer. Mr. Bloot was formerly with the Bureau of Mines and Geology in Monrovia, Liberia.

E. A. Knapp has resigned from the board of Paranga Mining and Exploration Company, Limited, a London company with gold mining operations in

JOHN J. CRAIG, authority on the beneficiation of iron ores, is now iron ore and steel consultant for the iron ore interests of Cyrus Eaton, chairman of the board of Chesapeake and Ohio Railway and Steep Rock Iron Mines Limited. Mr. Craig will participate

with Canadian and European metallurgical experts working on extensive iron ore deposits under development in the Ungava Bay area of Northern Quebec. Formerly he was manager of the iron ore and steel division consulting department of Arthur G. McKee & Company. His experience with that engineering firm covered the iron ore and steel industries of North and South America and Europe. He was a member of the International Commission appointed by Egypt in 1949 to study creating a steel industry in that country.



CHARLES H. BURGESS has taken over as vice president of Bear Creek Mining Company, the domestic exploration subsidiary of Kennecott Copper Corporation, and will make his headquarters in New York City. Mr. Burgess served with the War Production Board aluminum-magnesium division during World War II, and later was director of the strategic materials department of the Economic Cooperation Administration. He joined Bear Creek Mining Company as a district geologist in Minneapolis, Minnesota in 1952.



Western Australia. J. D. Read has joined the board.

F. W. Webb recently resigned from the board of Ariston Gold Mines, Limited, a London company with concessions in the Gold Coast Colony, Africa.

Dr. Jean Dugas has been appointed resident geologist by the Quebec Department of Mines for the Rouyn-Noranda district of Northwestern Quebec. He succeeds Dr. J. E. Gilbert, the newly appointed resident geologist for the Montreal area.

P. H. Anderson and W. M. Frames have resigned from the board of General Mining and Finance Corporation, Limited and are succeeded by R. B. Hagart and A. C. Wilson. Mr. Hagart is deputy-chairman of Anglo-American Corporation of South Africa, and Mr. Wilson is a director. Anglo-American and General have been associated recently in the financing of mines in the Klerksdorp area of South Africa.

D. C. Irish, chairman of Klerksdorp Consolidated Goldfields, Limited's local board in South Africa, has been made a director of the company.

P. S. Hammond has resigned from the board of Western Reefs Exploration & Development Company, Limited, a South Africa concern, and is replaced by E. S. Hallett. Mr. Hallett's alternate is W. M. Walker.

Hugh Flint has been appointed a director of Ampat Tin Dredging, Ltd., in Malaya.

Juan Lechin Oquendo, executive secretary of La Central Obrera Boliviana, is currently on an extensive tour of South America and Europe. Traveling from La Paz to Caracas, to London by way of Bermuda, and then on to Europe, Mr. Lechin is exploring the possibilities of acquiring a tin smelter for Bolivia, studying technical methods, and making contact with certain syndicates in the countries he is visiting.

Kenneth Hunter has joined Hycon Aerial Surveys, Inc. in Southern California as manager of the geophysical department. Before coming to Hycon, Mr. Hunter was a geophysicist with the Tsumeb Corporation in Southwest Africa. He holds degrees in physics and geophysics from the University of Toronto.



You Get "Pay-Off" Performance Every Day with Le Roi-Cleveland Sinkers

...because they have the right force of blow and strong rotation, from proper valve design and port arrangement

That's why Le Roi-Cleveland Sinkers bite into more rock . . . drill more footage per shift. A fast, positive-action end-seating valve, and precise port arrangement, provide powerful force of blow and strong rotation. And this automatic valve meters the air, too. It keeps air consumption down. You get longer life because the performance of this valve is not affected by wear.


Le Roi-Cleveland Sinkers are lubrication-protected. The rifle bar is oiled at every stroke of the

piston. This prolongs rifle nut life by 50 per cent or more. That's one of the reasons why you get "pay-off" performance every day in all conditions. Le Roi-Cleveland Sinkers are at their best when the going is toughest.

There's plenty of hole-cleaning power to aid the powerful force of blow and strong rotation of Le Roi-Cleveland Sinkers. They take a fresh bite of rock with every piston blow.

"Pay-Off" performance is really built into all Le Roi-Cleveland Sinkers. Use them to get peak efficiency every day . . . drill more feet of hole per shift. A complete line of Le Roi-Cleveland Sinkers is available from 18 to 80 lbs. Write today for full information.

RD-77

LE ROI  *Division of Westinghouse Air Brake Co.*
Milwaukee 1, Wisconsin



PORTABLE AIR COMPRESSORS



TRACTOR



STATIONARY AIR COMPRESSORS



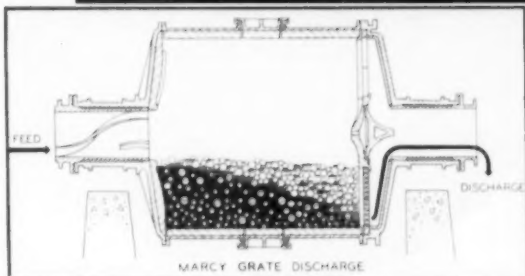
AIR TOOLS



ENGINES

how MARCY EXPERIENCE

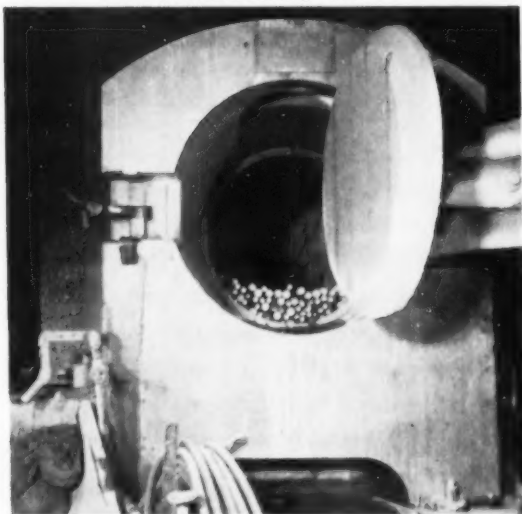
increases grinding mill output up to **50%**



Marcy Low-Pulp-Line Grinding, with Grate Discharge.



Marcy Discharge Grates with End and Side Clamp Bars and Center Discharge Liner.



Marcy Open End Discharge Housing, with Plug Door open.

After years of research in the field of grinding Mine and Smelter made the first ball mill, in 1915, incorporating the Marcy principle of grinding... "rapid change of the mill content is necessary for high efficiency"

The "rapid change of mill content" is accomplished by maintaining a low pulp line through use of the Marcy full-grate discharge in ball mills and the Marcy open end feature in rod mills.

Early operating experience proved the effectiveness of this basic principle in giving greater output at lower KWH per ton than other type mills. Refinements in design and construction, which can come only from experience, have continually improved both the mechanical and metallurgical performance of Marcy Mills.

This experience by M&S has resulted in production of Marcy Mills which, by actual operating data, have proved their ability to have up to 50% greater capacity than other type mills.

PROVED ADVANTAGES OF MARCY LOW-PULP-LINE GRINDING...

- eliminates wasteful cushioning action of high pulp level.
- provides an active, effective grinding mass to act on particle size reduction only.
- there is a faster migration of fines than oversize particles, thus less overgrinding.

YOU CAN HAVE THE ADVANTAGE OF
ALL THIS GRINDING EXPERIENCE...
JUST WRITE, CALL OR WIRE...

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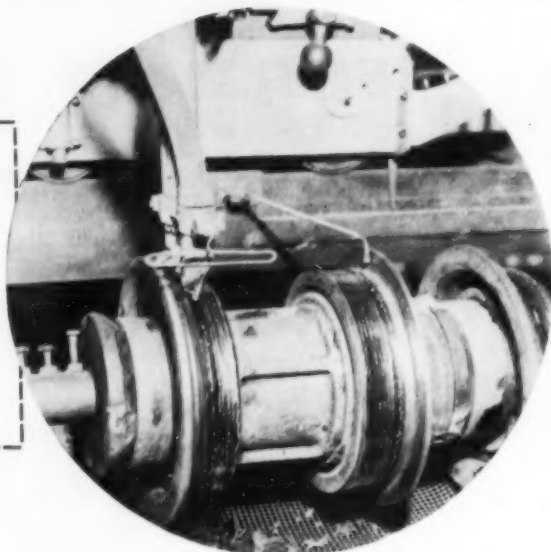
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Representatives in Foreign Countries

Does it pay to REBUILD TRACTOR ROLLERS?

here's one answer...

This is a report from one of the country's largest tractor maintenance shops having complete facilities for crawler reconditioning. It particularly concerns rebuilt track rollers, a major item of wear. In this shop rollers are regularly rebuilt and hard-faced by the automatic electric welding process, using Stooddy 105 on the running surface and flange.



About a year ago a tractor came into the shop for overhaul. The rollers were badly worn; those found suitable for rebuilding were returned to size with Stooddy 105 and the internal assemblies thoroughly reconditioned. The balance of the rollers were discarded and replaced with standard parts. Following routine procedure, the shop foreman checked the entire crawler assembly to insure proper alignment—a highly important factor in reducing needless wear. After 2500 hours this tractor came in again for its customary overhaul. Inspection of the rollers disclosed the following:

The standard rollers, without exception, were worn from $\frac{3}{8}$ " to $\frac{1}{2}$ " on the running faces; in all cases the internal assemblies required several replacement parts.

Hard-faced rollers showed negligible wear on running surfaces and the only replacements needed were new seals for internal assembly.

It is of course an accepted fact that rollers rebuilt and hard-faced with Stooddy 105 by the automatic method give a service life considerably beyond that of standard replacements—at a much lower cost. The hard-faced roller with its superior abrasion resistance reduces uneven wear on the track rails by providing a smooth,

even working surface that allows free movement of the rails and resists grooving of the roller. Hence, wear on the internal roller assembly is also decreased.

Stooddy 105, the alloy used in this application, was the first automatic wire of its type and is today the alloy generally preferred by principal shops. It has been proven by eight years of actual field use—assurance of maximum service life at reasonable cost.

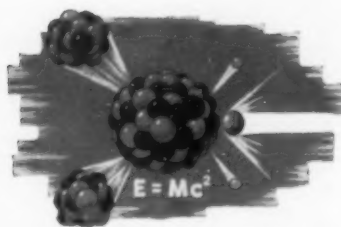
Earth-moving contractors operating large fleets of tractors, shovels, buckets and crushing plants often find the installation of an automatic welding head a profitable investment for rebuilding rollers, idlers, house rolls, crusher rolls and similar wearing parts. Many contractors, however, prefer to send such work to a thoroughly equipped automatic job welding shop of which there are a number located throughout the country. *A list of these job shops is available on request.*

Complete information on automatic hard-facing installations and procedures will gladly be supplied—without obligation. You may consult your local Stooddy dealer—see the "yellow pages" of your phone book under "Welding Equipment and Supplies"—or write direct.

STOODDY COMPANY

11969 East Slauson Avenue, Whittier, California

See the STOODDY EXHIBIT-WELDING SHOW, Buffalo, N. Y., May 9-11



FISSION FACTS

Monthly Roundup of Mining News
In the Atomic Energy Field

Uranium Institute Formed To Aid Public Relations

The Uranium Institute of America was formed in Denver, Colorado early in February by some 200 uranium company officials, uranium detection equipment manufacturers, and large and small uranium producers.

The meeting was called by Uranium Ore Producers Association's attorney, Stephen McNichols, who said a public relations effort was needed to inform the general public that uranium is good, healthy, and worthy of support.

A. Maxwell Hage of Grand Junction, Colorado, editor of the Uranium Ore Producers Association's "Uranium Information Digest," was named executive director of the Institute by the seven-man executive committee representing ore producers in Colorado, Utah, Texas, South Dakota, Wyoming, and New Mexico. The main function of the Institute is a nation-wide publicity campaign to restore public faith in the uranium mining industry. Mr. Hage pointed out the need for the Institute by illustrating the bad name given to uranium with nationally read articles titled: "Uranium—One of Five Frauds To Watch Out For," "The Coming Uranium Bust," and "Skull and Cross Bones Urged To Label Uranium Stock."

Dakota Interest Centers On Uraniferous Lignites

Manidon Mining Company of Mandan, North Dakota has made its first contract shipment of uraniferous lignite ore to the buying station at Edgemont, South Dakota, under a contract with the U.S. Atomic Energy Commission. The contract runs until March 31, and calls for a total of 100 tons.

Manidon is shipping from a 7,000-acre lease in southern Billings County. The deposit itself is estimated to cover about 120 acres and to contain about 3,000,000 tons of ore.

The AEC is currently investigating recovery of uranium from lignite at its Grand Junction, Colorado laboratory. It has reported that over 90 percent of the uranium is recoverable from lignite ash under present small quantity experiments, and the technique is now being applied to larger batches. If successful it will then be tried on a pilot-plant scale at the rate of 6 to 10 tons of raw material per day. Another method being investigated is that of recovery of uranium from lignite acid leach liquors by solvent extraction.

Presently the AEC and private prospectors are concentrating their exploration activities on uraniferous lignite deposits in a 5,000-square-mile area on both sides of the North Dakota-South Dakota border. State officials plan to open several hundreds of thousands of acres of state-owned land in southwestern

North Dakota for uranium leasing. In Dickinson, a meeting was held to organize a four-state uranium association which would foster development of the

uranium industry in both Dakotas, Wyoming, and Montana. Donn Bennett of Buffalo, South Dakota was elected president.

McKinney Panel:

Peaceful Uses of Atomic Energy

The report of the Panel on the Impact of the Peaceful Uses of Atomic Energy was released on January 30, 1956. This is an historic document because it is the first survey of its kind ever attempted in this new field. The Panel, headed by Robert McKinney, publisher of the *Santa Fe New Mexican*, and with eight other members representing industry, government, and labor, was established on March 26, 1955 by the Joint Senate-House Committee on Atomic Energy. The Panel was directed "To appraise the present and future impact of all aspects of the development of atomic energy on our way of life, our economy, our industry, our natural resources, and including the effect upon employment."

The entire atomic energy program starts with the mining industry, and the mining industry has responded with startling successes to the needs for uranium under the government's ore buying program. So successful, in fact, has been the response that the Panel makes no report of difficulties or slow-downs due to uranium shortages. On the contrary, overproduction seems most evident. Here are highlights of the report in regard to uranium which will be of specific interest to miners.

"The Office of Operations Analysis has estimated the future uranium ore requirements that would result from an expanded nuclear power industry in this country . . . The average annual ore rate required for the period 1960-1975 may vary from a few hundred to 19,000 tons (of contained) U_3O_8 per year . . . An estimated probable range of 1975 procurement rates has been made of 5,000 to 20,00 tons U_3O_8 per year for domestic nuclear power.

"Uranium mining and milling have come of age . . . Government expenditures . . . have received impetus from military requirements . . . To improve or even continue the position attained, exploration for new deposits and development of reserves must go forward.

"Price guarantees are intended to assure the profitability of mining operations, and in fact provide the only economic basis for the uranium mining industry which has developed in the United States.

"The stable ore prices which thus resulted incidentally benefit those looking toward putting the same materials to work for peaceful purposes.

"While the guaranteed ore price system was initiated to assure meeting military requirements, the present system for stabilizing the market, however, has no basic element within it which is the only way to meet the needs of future industrial uses.

"At least one alternative is available. It might be possible to satisfy military requirements by giving guarantees of the minimum quantities of uranium needed from domestic sources in some selected number of subsequent years. In this way, uranium ore producers would begin to have a free market, with the assurance that the government would be active in that market as a buyer to some definite and predetermined extent.

"As an alternative to price guarantees in accomplishing the transition to a free market, tonnage guarantees based upon military requirements should be considered. Any guarantees should be reviewed annually and extended on a 5-year moving basis only if justified by military requirements.

"The Commission recognizes that military requirements for uranium are the present reason for ore-price guarantees and that a free market should be the objective for the era of expanded peaceful uses without guarantees; that the Commission, as an alternative to price guarantees in accomplishing the transition to a free market, consider tonnage guarantees based upon military requirements."

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IN LATTER-DAY GOLD RUSH, THIS **D8** WORKS **FAST**



When each yard of dirt contains only a few cents' worth of gold, and when you have to pack a full year's mining into three summer months—you need dependable equipment that works *fast*!

That's why B. Bratsberg has a Caterpillar D8 Tractor. He owns and operates Gold Bottom Placers near Dawson, Yukon Territory. His mine is two miles from "Henderson's Discovery," which started the gold rush in 1896. But his mining method is vastly different from 60 years ago: Mr. Bratsberg's D8 strips and 'dozes into the sluice box and stacks tailings. With its No. 8A Bulldozer it moves $4\frac{1}{2}$ cu. yd. each load and averages a load a minute while sluicing.

"Our short season means we've got to keep going," Mr. Bratsberg says. "I wanted a tractor that was dependable and able to do a lot of hard work. My D8 moves a lot of yardage economically." During the three-month summer season this CAT* D8 Tractor works nine hours a day, seven days a week. It went seven years (4800 hours) before overhaul.

And now there is a new D8 that will perform even better. The Caterpillar D8 Tractor, with torque con-

verter or with exclusive oil clutch, has a completely new, 191 HP diesel engine. Controls are hydraulically boosted and easy on the operator. "Live-shaft" drive lets you operate rear-mounted equipment independent of the flywheel clutch.

The new D8 is available with a choice of bulldozer blades and controls to suit your operation. Your Caterpillar Dealer will be glad to demonstrate the D8 or other Cat Diesel Tractor on *your* job. Call him today and find out about the tractor that will produce the most at the lowest cost.

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U.S.A.

CATERPILLAR*

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Philippines Study Terms For Developing Ni Ores

General proposals from mining companies for the development of nickeliferous iron deposits on the Surigao Mineral Reservation in Mindanao should be submitted to the Philippine Government by March 31, 1956. This was the outcome of a meeting held by the Presidential Technical Committee and a group of interested organizations.

Test pitting by the Philippine Bureau of Mines has revealed the existence of a 29,000,000-metric-ton ore body of ferruginous laterite containing 1.38 percent nickel on the island of Nonoc within the reservation. The government has recently adopted the policy of opening the area to development by private enterprise through public bidding (see MINING WORLD, November 1955, page 68).

The purpose in asking for general proposals from interested companies is to supply the Presidential Technical Committee with information for guiding it in the preparation of the terms and conditions of bids, and will not be binding on either party. In addition, the general proposal need not contain information that the bidder would like to withhold until the final bid is submitted. Among those attending the meeting were representatives from Surigao Consolidated Mining Company, Benguet Consolidated Mining Company, and Hanna Coal and Ore Company.

Bureau of Mines Starts Study of Copper Recovery

Highlighting activities of the United States Bureau of Mines in 1955 were three long-range mining studies, designed to conserve resources by increasing recovery of ore. The investigations were started at large Michigan, Arizona, and Nevada copper mines, according to a summary released by Douglas McKay, Secretary of Interior. Projects were carried out in all fields of metal and non-metallic mining, mineral research, coal, petroleum; studies were made of health and safety factors.

For the United States Atomic Energy Commission, potentially important deposits of fissionable elements were outlined by the Bureau in Idaho, Georgia, Montana, South Carolina, and Washington. A Bureau-developed planer, a mechanical mining machine that can be operated by remote control, was tested successfully in an area of a Montana phosphate mine that had been abandoned as unsafe for conventional mining methods.

Newmont, American Metals Financing Winklaak Mine

The Newmont Mining Corporation, and the American Metal Company, Ltd. are reported as two members of a group of mining companies financing the first uranium-gold mine in the Bethal area of the eastern Transvaal Union of South Africa. (See MINING WORLD, page 85, February 1956). A new company—Winklaak Mines Ltd.—is now in public flotation under the auspices of Union Corporation Ltd. The major subscribers

in addition to Newmont and American Metals of the issued capital of 12,000,000 shares of 10 shillings each are or will be Union Corporation directly and through its wholly owned subsidiary—Capital Mining Areas Ltd.; Anglo American Corporation of S.A. Ltd.; Central Mining and Investment Corporation Ltd.; Federale Mynboumaatskappy Bpk.; The Rio Tinto Co. Ltd.; Anglo-Transvaal Consolidated Investment Co. Ltd.; General Mining and Finance Corporation Ltd.; Johannesburg Consolidated Investment Co. Ltd.; New Consolidated Gold Fields Ltd. etc.; Anglo-Rand Mining and Finance Corporation Ltd. and its shareholders; and the public, to whom 1,750,000 shares are being offered for subscription at 15 shillings each. The lease area of the mine is 5,115 claims, slightly south of Kinross, about 70 miles east of Johannesburg. A very extensive drilling program showed the Kimberley Reef, dipping northwards at between 25 and 30°, to be the economic gold-uranium bearing horizon, at depths from 760 to nearly 5,000 feet in the holes drilled. Faulting indicated is described as fairly severe, and accordingly water may be encountered. The borehole values indicate payability of up to about 80 percent, but since the Kimberley Reef is known to be a somewhat erratic gold carrier, fluctuations in values and payability may be disclosed. The average grade suggested by the borehole values is from 6 to 7 dwt. over an assumed width of 40 inches. The shallow depth of the reef in the suboutcrop zone means rapid development of the orebody and an early start of production. This is expected at an initial rate of 60,000 tons a month by about mid-1958, to be raised to 100,000 after about another year.

Mt Isa Reports Greatly Increased Ore Reserves

As a result of exploration and development work last year, Mount Isa Mines, Ltd. at Mount Isa, Queensland, Australia is able to report greatly increased ore reserves. Proven silver-lead-zinc ore reserves now stand at 1,200,000 tons assaying 8.5 percent Pb, 6.2 percent Zn, 6.1 ounces Ag per ton; copper ore reserves total 5,100,000 tons assaying 4.0 percent Cu. These figures by no means represent the limits of the ore bodies.

The existence of very large bodies of low-grade silver-lead-zinc ore have also been proven. This can only be mined after undertaking heavy capital expenditure and mining on a greatly increased scale (probably by open pitting). Strength of lead-zinc mineralization continues in depth on the northern leases, 12 miles north of Mount Isa proper. This may develop into a second Mount Isa.

Lead ore mined during 1955 amounted to 670,500 tons; 754,000 tons of copper ore were also treated. Profit was a record of £3,307,250, with metal sales valued at £13,782,956, as compared with £10,548,544 the previous year.

Considerable sums are still being spent on capital expenditure and development. General reserves stands at £5,500,000. Projects under consideration are a zinc recovery plant and a copper refinery. It is believed that considerably increased copper production is planned during the next three years and a further shaft may be necessary.

Norwegian Taconite Plant Sets Production Record

A/S Sydvaranger at Kirkenes, Norway, the first company in the world to mine and process magnetic taconite on a commercial scale, set a new Norwegian record last year with a total production of 867,000 tons of iron ore concentrates. The 1956 sales volume is expected to reach about 1,000,000 tons of concentrates. Contracts on hand assure sales of the entire Sydvaranger output until the end of 1959. Most of the concentrate will be shipped to West Germany, with smaller quantities going to Great Britain, Austria, and Belgium.

Sydvaranger, which recently observed its 50th anniversary, has survived two World Wars which reduced the company to bankruptcy in the 1920's, and gutted the operation in the 1940's. The plant was rebuilt following World War II, and is designed to handle about 2,300,000 tons of ore a year, equivalent to some 1,000,000 tons of concentrate. The entire operation was fully described in the special October 1953 issue of MINING WORLD.

O'okiep Agrees To Cutback GSA Tungsten Deliveries

The O'okiep Copper Company of the Union of South Africa has agreed to a cutback in delivery of tungsten to the United States General Services Administration. Early in February the GSA announced a saving of \$2,429,000 by negotiating a reduction in a purchase contract with the South African producer.

The GSA Emergency Procurement Service first entered into an agreement with O'okiep at the beginning of the Korean War when demand for tungsten was extremely high. The contract as set up at that time would have involved an expenditure of \$7,000,000 for the purchase of 120,000 short ton units of the metal. However, deliveries from domestic mines picked up in the interim to a point where the United States need for foreign supplies was reduced.

The O'okiep tungsten operations were described in the special O'okiep issue of MINING WORLD in May 1955.

Two Shaft Projects Slated For Rix-Athabasca Mines

Two extensive underground development programs, with a combined cost of \$525,000, may increase considerably the scale of mining operations at Rix-Athabasca Uranium Mines Ltd. in northern Saskatchewan, Canada.

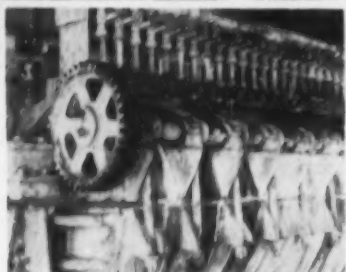
An immediate start will be made on the extension program for the Smitty mine, and a start will be made in June on the extension program for the Leonard mine.

The new Smitty program consists of deepening the Smitty shaft at least two more levels and undertaking several hundred feet of lateral work. This will allow deeper development of the Smitty hanging wall ore body, the Smitty footwall ore body, and the West Smitty ore body. This program is estimated to cost \$200,000 and the sinking contract has been let to O'Hay Development.

The Leonard program will consist of sinking a shaft two levels from the Leon-



General view of plant with three Dorr Thickeners in foreground.



Closeup of one of the six Sweetland Filters.

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solution is concentrated in triple effect vacuum crystallizers. The resulting crystals are thickened in two 30' dia. Dorr Units and are then calcined to soda ash. Operated by Westvaco Chlor-Alkali Division of Food Machinery and Chemical Corporation, the plant has a capacity of 350,000 tons per year.

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ard adit. Considerable lateral development will develop the Leonard system of high-grade veins and will help explore also the large 201 ore-bearing structure. This program will cost about \$325,000.

Since April 1954, Rix-Athabasca has been producing at a rate of 100 tons per day and selling this ore to the Eldorado Mining and Refining Company Ltd's mill.

Fresnillo Buys Mexican Mine From Eagle-Picher

Eagle-Picher Company has sold a portion of its Mexican lead and zinc properties in the Naica mining district, state of Chihuahua, to the Fresnillo Company. The property had only been partially developed so Eagle-Picher's present Mexican production and operations will be affected to only a very minor degree.

Eagle-Picher began prospecting and operating near Taxco, state of Guerrero, about 15 years ago. Profits from Taxco, together with additional capital, were invested in other mines while exploration was conducted in the Naica mining district and elsewhere.

Fresnillo's purchase of the property (the Gibraltar) which adjoins its own lead-zinc-silver operations in the Naica lease, adds considerably to the firm's reserves. The capacity of the Naica mill will be increased to raise production by about 50 percent. The average grade of the Naica-Gibraltar ore is higher than that of the ore from the Fresnillo.



BRITISH GUIANA—Harvey Aluminium Inc. has applied to the British Guiana government for exclusive permission to explore more than 1,000,000 acres. The neighboring Dutch colony, Surinam, has rich bauxite deposits in a formation similar to that in British Guiana.

COLOMBIA—The expenditure of £37,500 on the purchase and installation of plant and machinery for a mill has been approved by the management of *Frontino Gold Mines Ltd.* following recommendations made by consulting engineers who visited the property recently. A review of the company's operations for the nine months ended September 30, 1955 showed that ore reserves had increased by 65,000 tons over the figure of 212,845 tons recorded on December 31, 1954. Also gold production for the nine months had risen by 5,614 ounces to 58,280 ounces. Profit for the nine months was estimated at £ 173,000.

MEXICO—Discovery of a large deposit of iron ore near Ciudad Camargo, Chihuahua, has been announced by Ing. Moises Garza, technical director of *Altos Hornos, S.A.* The latter operates an iron and steel mill at Monclova. Mr. Garza compares the quality of the new find with the famed iron mountain named Cerro de Mercado near Durango. *Altos Hornos* will develop the Ciudad Camargo deposits. A 2,000-ton-daily treatment plant is planned, along with construction of a 45-mile-long railroad which will link the deposits with the railhead at Escalon from which the ore will be moved to the Monclova headquarters.

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FRENCH GUIANA—National Uranium Corporation of Utah has obtained the right to develop and mine a large gold placer deposit in French Guiana. Permission was granted by the French Bureau Minier Guyanais, a corporation established by the French government to further the development of French Guiana's natural resources. The area to be mined covers 17 concessions totaling about 200 square miles. Engineers of the Bureau reportedly have already blocked out at least 7,500,000 cubic yards of gold-bearing gravel with an average gold content of 0.72 grams per cubic yard. National Uranium will coordinate these activities with its other current operations in French Guiana. It holds extensive columbium-tantalum concessions (see MINING WORLD, October 1955, page 75.)

CUBA—Aero Service Corporation of Philadelphia has been photo mapping the entire island of Cuba, along with adjacent islands of the Republic. The photos will be used for geologic study and general reconnaissance by the oil and mining industries, as well as by engineering companies and others at work on Cuban development.

FRENCH GUIANA—The Bureau Minier reports discovery of a bauxite deposit in the Kaw area, estimated to contain about 42,000,000 tons. The aluminum oxide content of the ore is said to average 41.5 percent, as compared with 50 to 60 percent in major deposits of other countries, but this is partly offset by the low silicon content of the Guiana ore. The Bureau says that although the deposits are located within reasonable access of the coast, the relatively low aluminum oxide content precludes exporting the ore for processing elsewhere. Economic development could be undertaken only by building a plant at the site.

BOLIVIA—Three Japanese mining firms will send representatives to Bolivia at the invitation of the Bolivian government to survey zinc, copper, and tin resources. The Tokyo Zinc Company is sending two experts to survey the Bolivian zinc mines in operation; the Japan Mining Company is sending two geologists to search for undeveloped copper properties; and the Toyo Mining Company is sending an engineer to study tin mining facilities in use there. This is said to be the first time Japanese mining representatives have gone to Bolivia.

CHILE—The Anaconda Company's request to the Chilean government for permission to invest \$38,000,000 in plant expansion and new housing for employees at Chuquibambilla has been approved. When the project is completed, copper production will have been increased by about 100,000,000 pounds or 45,000 metric tons. The company is expected to submit another request shortly for permission to bring its Indio Muerto mine in Tarapaca Province into production.

BRAZIL—The Poços de Caldas Plateau in Minas Gerais State has been studied in detail by the government because it is already known that this area contains valuable deposits of uranium and thorium. The thorium ore deposits are located at the place named Morro do Ferro. This ore also contains rare earth minerals.

MEXICO—A \$32,000 diamond drilling program will be undertaken by the National Stimulation Commission at the Nueva Luz group of mines. The drilling will be conducted on several levels for

a total of 2,000 feet in an attempt to locate gold-silver veins. These mines were unwatered by the commission in an operation that took nearly a year.

HAITI—Consolidated Halliwell Mines Ltd., through its subsidiary Haitian-American Minerals, is drilling on its 365-square-mile concession in the northwestern sector of Haiti. A series of closely spaced drill holes has suggested a flat, thick, basin-like structure with good copper showings. The orebody could be mined by open pit, and tentative plans call for construction of a concentrator if the drilling continues to be satisfactory. An aerial survey of the concession will be made, and a ground crew will also carry out a magnetometer survey.

CUBA—Mineral exports during 1955 were as follows: 264,059 tons of manganese; 106,485 tons of pyrite; 43,663 tons copper; 34,505 tons chrome; 18,785 tons iron; 16,567 tons nickel.

BRAZIL—Important lead deposits were recently discovered in some areas of Brazil. They are: Alto Garcia, District of Blumenau (Santa Catarina State), Boquira and Tiros, District of Macaúbas (Bahia State), and Ribeirão do Rocha, District of Cerro Azul (Paraná State). According to the Brazilian Department of Mineral Production, the reserves at Alto do Garcia are estimated to be about 1,000,000 metric tons. These new occurrences will increase considerably the lead production in the country.

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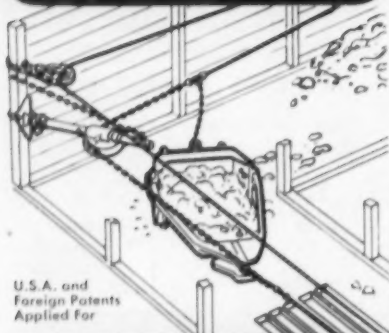
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TURKEY—The Turkish Institute for Mineral Resources Development (MTA) reports that a uranium deposit has been located near the town of Yozgat, 100 kilometers east of Ankara. Results appear promising, and it is hoped that after prospecting is completed, mine development can be undertaken. Uranium in the form of torbernite has also been found near Sivas, but generally not much uranium exploration has actually been carried out in Turkey. For example, the Menderes Massive southeast of Smyrna has not been mapped as yet although there is a possibility that this area might contain uranium.

MALAYA—South East Asia Bauxite (SEABA), a subsidiary of Aluminium Ltd. of Canada, has concluded an agreement with *Ramunia Bauxite* of Singapore which should increase bauxite exports by the middle of this year. Under the agreement, Ramunia will mine ore from Seaba's properties in Johore. Mining and processing are to be at a rate of 40,000 tons per year, but provisions have been made for mining and processing larger amounts if world market conditions warrant this.

JAPAN—Metal production achieved a post-war high in 1953 with output reported as follows: electrolytic copper 113,316 metric tons (106,478 in 1954); lead 37,135 (34,114 in 1954); electrolytic zinc 72,678 (68,108); distilled zinc 38,875 (32,732). On other metals, the following eleven-month production figures are available: tin 922 metric tons, compared with 792 metric tons for the first 11 months of 1954; gold 8,076,351 grams, compared with 8,597,668 grams; and silver 204,928 kilograms, compared with 217,142 kilograms.

MALAYA—Sungei Way Dredging Ltd. had originally intended to close down its No. 2 dredge in the first part of 1955 for a conversion from steam operation to electricity. However, delays in obtaining necessary equipment postponed the conversion work until late October. This is now well underway and the treatment plant is being modified at the same time. Increased recoveries should be obtained when both go back into operation later this year. No. 3 dredge worked well in 1955, but in recent weeks recoveries have been affected by the nature of the ground being worked, which consists of stiff clay overlying a pinnacled limestone bottom. These conditions are not expected to persist, however, and improved recoveries are expected in the immediate future.

JAPAN—Negotiations are reported to be underway between India and Japan over development of the *Orissa* iron mine in India. Reportedly, the special Presidential Fund for the aid of South-east Asian nations would be used to finance the project, and it has not yet been decided whether the project will be presented to the United States as an official or private agreement. Under the proposed arrangement, Japan would export to India 75 to 100 railway locomotives, worth about \$8,000,000. Payments would be made in installments. In return Japan would be able to import annually 2,000,000 tons of iron ore from

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the mine over a certain period. This purchase contract would be a private one. India's plan for the development is said to call for a total capital of \$50,000,000, of which \$20,000,000 would come from India itself, \$22,000,000 from the Presidential Fund, and the remaining \$8,000,000 from Japan in the form of the locomotives.

INDIA—A recent collaboration between the *United Austrian Iron and Steel Works (VOEST)* and *Krupp* (Germany) has resulted in a project for the building of an oxygen jet converter plant in India. Planned capacity is 1,000,000 tons of steel a year, 750,000 tons of which will be produced according to the VOEST method, and the remainder in the Siemens Martin furnaces.

MALAYA—The *Malayan Mining Employers' Association* and the *Malayan Mining Employees' Union* have agreed in principle to set up joint industrial councils at three levels. These are the national joint industrial council, the regional joint industrial councils, and mine committees. The agreements cover the tin mining industry only, and are aimed at promoting negotiations and consultations on matters of mutual concern to employers and employees. Draft plans include: equal representation by both groups on national council which will be the permanent machinery for negotiations on wages and work conditions; regional councils in Perak and Selangor which will assist in implementing agreements made by the national council; mine committees at each tin mine which will iron out local disputes between labor and management.

BURMA—*Burma Corporation* (1951), which is jointly owned by *Burma Mines* and the Burma government, reports a sharp increase in profits for the September 1955 quarter. The net profit of £143,265 after taxation and depreciation compares with £76,838 for the previous June quarter. Production amounted to 3,942 tons of refined lead, 4,035 tons of zinc concentrate, and 348,236 ounces of silver. In the June quarter output was 2,150 tons of lead, 3,726 tons of zinc, and 219,432 ounces of silver.

MALAYA—*Ippoh Tin Dredging* reports that during the last fiscal year the area of virgin ground dredged amounted to 26.39 acres and the area of tailings dredged was 7.73 acres, making a total of 34.12 acres dredged. From this, a volume of 2,377,500 cubic yards were treated for a recovery of 526.75 tons of tin ore, equivalent to an average recovery of 0.495 pound per cubic yard. These figures represent a 21 percent greater yardage, and 29 percent higher average grade; the amount of tin ore produced was some 58 percent greater.

TURKEY—A molybdenum deposit is being developed near the village of Gelemic, district of Bursa, on the southern side of the Uludag Mountains. Investigations are said to have proven about 250,000 tons with an average grade of 0.45 percent Mo.

PAKISTAN—Engineers and geologists at Quetta have formed an Institute of Mining and Geology of Pakistan with a view to promoting the science and practice of mining and geology in the country. Central Industries Minister Habib Ibrahim has agreed to become the first sponsor. The new group hopes for recognition from the Central Government.



WESTERN AUSTRALIA—At Cockatoo Island, Yampi Sound, output of iron ore will rise to 1,000,000 tons per year when the sinter plant of *Australian Iron and Steel Ltd.* is completed at Port Kembla, New South Wales. The ore on Cockatoo Island is mined from the open pits by four-cubic-yard electric shovels; transported to the ore-loading dock in Diesel trucks; and shipped 3,000 miles to the east coast in company-owned, 12,500-ton ships. Because of its friable nature, a considerable proportion of fines must be handled by the smelting plant. Sintering will reduce the dusting and increase furnace capacity.

NEW CALEDONIA—The New Caledonian mining company, *Le Nickel*, will be granted certain "Treasury facilities" by the French government to help it to equip its mining and metal processing plants at Noumea. The company is planning an expansion to 10,000 tons of nickel annually. In 1954, output was 8,400 tons. The government will provide similar assistance to the New Caledonia power company *Enercal* which will build a power plant on the Yate River. Part of

the power will be used for the nickel plants.

REPUBLIC OF THE PHILIPPINES—*Lepanto Consolidated Mining Company* has hired a noted geologist, Domingo Lim, to explore a tungsten deposit located on company property at an undisclosed place in the Philippine Islands. If development of the property is undertaken, it will be the first tungsten mining in the islands. Mr. Lim is a graduate of the Colorado School of Mines and has had extensive experience in tungsten exploration and mining in the United States and Mexico.

VICTORIA—*Morning Star* (GMA) *Mines N.L.* at Wood's Point has increased the depth of its internal inclined shaft to 492 feet below the No. 19 level. Recent ore has assayed 7 dwts. per ton. This is one of the oldest gold mines in the country. It discontinued its main shaft operations in 1953 when it entered vertically bedded slates which were severely crushed and water impregnated. The new shaft is being sunk in diorite.

INDONESIA—Manganese findings are reported from the western part of the Menoreh Mountains in the areas of Loano, Kaligising, and Tjangkep in the county of Purworedjo (Java).

REPUBLIC OF THE PHILIPPINES—*Atlas Consolidated Mining and Development Company* has increased mill production to 6,000 tons per day at the Toledo copper property on Cebu Island.



Marcona Builds Iron Pilot Plant In Peru

The Marcona Mining Company is installing a 10 ton per hour pilot plant at its iron ore mine on the west coast of southern Peru. The pilot plant flowsheet employing gravity, magnetic, and flotation units, as well as auxiliary equipment was developed by Utah Construction Company's metallurgists in the company's ore dressing laboratory in Palo Alto, California. Marcona is owned jointly by Utah Construction and Cyprus Mines Corporation. All equipment has been shipped from the United States and the pilot plant is scheduled for operation by April 1, 1956. The top picture above shows a typical mining scene at the open pit mine 29 kilometers from the Port of San Juan shown in the lower picture. All ore is trucked to the port for loading into ships shown at anchor which transport it to eastern United States seaports. The new pilot plant will be built at the port and is designed to use sea water. The purpose of the plant is to develop design data and determine the effect on equipment of using sea water for the construction of a commercial beneficiation plant, which Marcona plans to build to augment its present production facilities.



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8-180

A new turbine provides the necessary additional power. December production from the Toledo mine was 130,564 tons of ore treated, the highest monthly tonnage since the start of operations in 1954. Copper concentrate output was 3,290 dry short tons, estimated to contain 1,408,943.6 pounds of copper and 394 ounces of gold. Lack of sufficient power caused by a temporary local shortage had prevented the company from achieving a planned higher output. To prevent a recurrence, the company is installing oil burners in the boilers as a standby measure. The company expects to achieve a 10,000-ton capacity by the end of this year. (See MINING WORLD, January 1956, page 67.)

NORTHERN TERRITORY — *Peko Mines N.L.* at Tennant Creek is now treating 3,500 to 4,000 tons per four-week period for a recovery of 1,100 to 1,200 tons of concentrate assaying 25 percent Cu and 10 dwts. gold per ton. Some of the output is being sent to Japan and some is being treated at Port Kembla, New South Wales. An increase in ore treatment of 50 percent is contemplated during the next year. Due to higher freight costs, the company has installed a drier to remove practically all moisture from the concentrates prior to shipment.

NORTHERN TERRITORY — *Northern Hercules N.L.* has begun regular production at its *Pine Creek* mine. Ore throughput will be increased to 100 tons per day as soon as possible. Some very rich disclosures of ore continue to occur. These run up to 40, 50, and even 60 dwts. of gold per ton but the shoots are patchy.

REPUBLIC OF THE PHILIPPINES — During December, *Lepanto Consolidated Mining Company* produced 4,552 tons of concentrates estimated to contain 1,912,160 pounds of copper and 3,429 ounces of gold. The month's output contained an average of 21.00 percent copper and 0.739 ounce gold per dry short ton. Ore treated totaled 36,380 tons, and average copper content of the ore was 2.79 percent; average gold content of the ore was 0.116 ounce per ton. Copper recovery was 94.1 percent, and gold recovery 81.2 percent.

INDONESIA — Gypsum, reportedly of good quality, has been found in Nangbo, Central Flores, which is one of the lesser Sunda isles.

NEW SOUTH WALES — *Zinc Corporation Ltd.* and *New Broken Hill Consolidated Ltd.* have again shown production increases in their latest annual figures. For the year ended December 13, 1955, Zinc Corporation reports that 653,000 tons of ore were mined to produce 83,479 tons of lead, 117,000 tons of zinc concentrates, and 1,833,000 ounces of silver. New Broken Hill mined 530,000 tons to produce 42,767 tons of lead, 134,000 zinc concentrates, and 848,000 ounces of silver.



EIRE — Recent drilling by *Irish Copper Mines, Ltd.* has greatly increased ore reserves at its copper-lead-zinc-sulphide property 40 miles south of Dublin. Initial examination indicated re-

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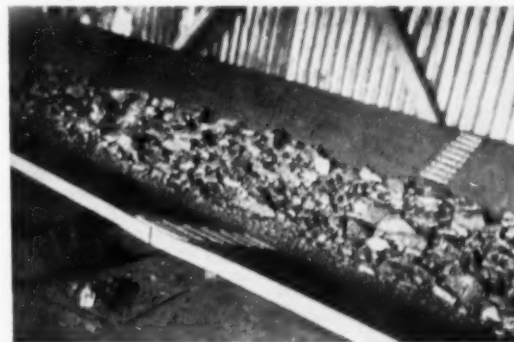
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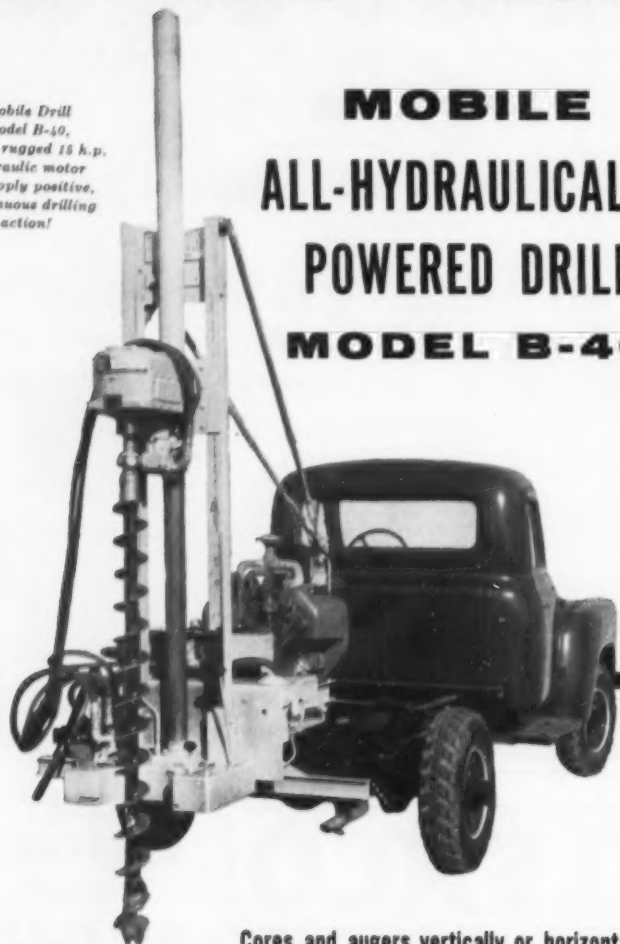
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serves totaling 13,700,000 long tons; latest drilling indicates the possible addition of 4,000,000 to 5,000,000 long tons bringing total to about 20,000,000 tons. Present plans call for driving of an incline at a gentle slope from a point just above sea level to a depth of 650 feet below sea level. Sublevels will be cut at intervals of 60 feet, and all servicing of the mine, handling of men, materials, and ore haulage will be by 31-ton trucks. Ventilation and pumping will be through existing shafts sunk by previous operators. Tentative plans are being made for a mill.

HUNGARY—The ever increasing demand for manganese has prompted the Hungarian government to modernize the *Urkut* manganese mine located in the western part of the Bakony Hills. The operation has been completely mechanized, and a third shaft has been built. This mine, together with the manganese mine in Epleny, now enables Hungary to meet its domestic demand and also export small amounts.

YUGOSLAVIA—The Yugoslavian government plans to mechanize the barite mine in Lokve, if the quantity of the deposits, not yet completely surveyed, justify investment. Production from the *Lokve* mine started in 1953 with an output of 2,000 metric tons. This increased to 6,000 by 1954, and was expected to produce 8,000 metric tons in 1955. The entire output is exported to the United States and West Germany. Preparations reportedly are also being made to ship 2,000 tons to the Soviet Union.

ITALY—Parliament will soon be called upon to discuss remedial measures for the Italian sulphur industry. Production in 1954 totaled 203,000 tons, 148,000 tons of which were produced in Sicily. The remainder came from continental Italy. During that year no sales were made abroad and stocks rose to 330,000 tons at the end of 1954. During the first nine months of 1955 production continued at about the same rate, and exports were little more than nominal (about 5,000 tons in August and September). Consequently, stocks rose to more than 350,000 tons by the end of September. One bill pending before Parliament would increase subsidies granted in 1951 from 9,000,000,000 lire to 12,000,000,000. This money is for technical reorganization of the mines in an attempt to reduce high production costs. Adoption of more modern techniques is also expected to increase the yield of refined sulphur and bring over-all production to about 320,000 tons a year.

U.S.S.R.—The first shaft of water jet blast mining has been completed at the manganese mine of Nikopol in the Ukraine. Only one-third of the crew will now be required.

AUSTRIA—At the *Styrian* iron mine in Erzberg, the concentration of sandy iron ores has been tried successfully in a combined system of washing cyclones and Humphreys spirals. In 1956 a pilot plant will be placed in operation.

BULGARIA—The Soviet Union is reported to have transferred its share in the joint mining company, *Gorubso*, back to Bulgaria in return for repayment over a number of years. The joint Russian-Bulgarian firm was one of the most important of the joint companies established to develop Bulgaria's mineral potentialities after the war. Most of the other companies were sold back to the

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government in October 1954. This firm was responsible for the mining of brown and hard coal, copper, iron ore, lead, zinc, chrome, manganese and oil. It is believed that the mining of uranium is handled by another firm in which the Russians still retain control.

EIRE—A geophysical survey will be undertaken of existing copper, silver, and lead deposits at Croggan which have not been worked for 80 years. If the survey indicates that further development is warranted, the *Armagh Committee of Agriculture* which is sponsoring the survey, will ask the Northern Ireland government to take steps to reopen the mines.

YUGOSLAVIA—A record output of about 74,000 metric tons of lead was

achieved in Yugoslavia in 1955, compared with an output of 66,000 tons in 1954.

AUSTRIA—The Third International Light Metals Convention will be held at the Montanistische Hochschule at Leoben June 6 through 9. The present state of light metals development will be discussed, and leading experts from Europe, Canada, and the United States will present their views on such topics as: light metals in the national and world economy; metallurgy of the light metals; technology of light metals; metallography and physics of the light metals; and development of light metals. Information may be obtained from the Committee of the Third International Light Metals

Convention, Leoben/Stmk., Austria, Montanistische Hochschule, Institut fuer Metallkunde.

ENGLAND—Growing use of flash roasting processes for the manufacture of sulphuric acid from pyrite is believed to be a partial solution to the continued scarcity of selenium in the United Kingdom. Selenium is being recovered from cyprus pyrite by a method developed by the chemical research laboratory of the *Department of Scientific and Industrial Research*. *Laporte Chemicals* is now recovering approximately 2 tons of selenium sludge per year from its Yorkshire acid plants.

WEST GERMANY—The government import committee has authorized importation of DM 21,000,000 worth of both copper for refining and electrolytic copper cathodes from the United States, Canada, and Mexico. Chilean copper is also permitted under the order if it is owned by United States companies and purchased by Germany through the United States.

ENGLAND—*British Metal Corporation* has been appointed agent for the sale of titanium and titanium alloys produced by the *Titanium Metals Corporation of America*. The agreement includes all parts of the British Commonwealth, excluding Canada.

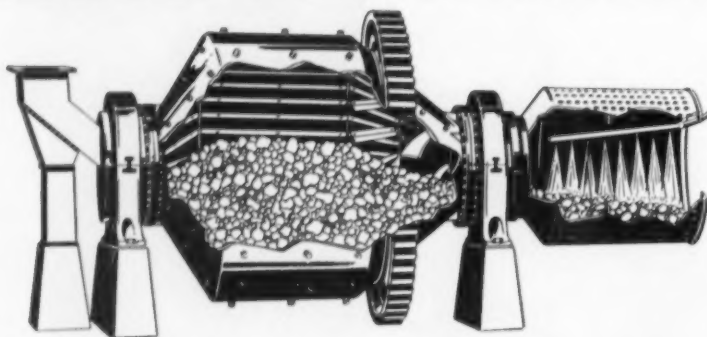


BELGIAN CONGO—A new mining company has been formed to explore and develop extensive lead deposits which have been discovered on the property of the firms who have formed the new company. Participating in the new venture are the *National Committee of Kivu*, the *Great Lakes Mining Company*, and the *General Minerals Company*. The firm will start with a capitalization of 6,000,000 Belgian francs.

UNION OF SOUTH AFRICA—The ventilation section of the twin-shaft system of *Buffelsfontein Gold Mining Company Ltd.* has been completed to its final depth; the final depth of the hoisting section is expected to be reached by the end of March. Trial milling will probably be started after the middle of this year. At the *West Driefontein Gold Mining Company's* property, the No. 3 shaft has been completed to its final depth of 4,405 feet. Water-bearing ground requiring cementation has retarded sinking of the No. 5 shaft but some progress is being made.

FEDERATION OF RHODESIA & NYASALAND—Production at the *Chibuluma Mines Ltd.* copper and cobalt mine at Nkana, Northern Rhodesia, is almost at full planned capacity. Actual production of copper-cobalt concentrates will have to wait for completion of the mill now scheduled for April. No drilling in the promising Western area has yet been done and an exploration program to prove additional ore reserves will not be undertaken until the company has repaid its £5,000,000 loan to the United States.

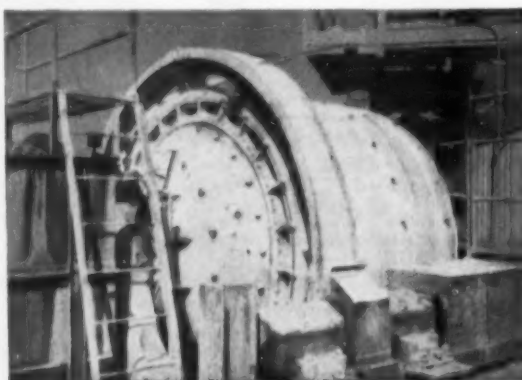
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Bulletin 37-A-1

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BELGIAN CONGO—Union *Minière du Haut-Katanga* has completed the Le Marinel Dam on the Lualaba River in the Upper Katanga which is intended to further harness the power of the Lualaba for a fourth power station, Le Marinel. This will be the most powerful of the hydroelectric stations Union *Minière* has built. The three others are the Francqui station at Madingusha (Cornet Falls), the Bia station (Koni Falls), both on the Lufira, a tributary of the Lualaba, and the Delcommune station (Zilo Falls). All have been built to meet the ever-increasing needs of both Union *Minière* and the Upper Katanga, which are estimated to reach 1,300,000,000 kw hr in 1960 and 1,800,000,000 in 1970. In addition, during the five years that will follow the commissioning of the Le Marinel station, this one will annually supply 500,000,000 kw hr to the Northern Rhodesian copper belt by means of a 500-kilometer line connecting Le Marinel with Kitwe, Northern Rhodesia. The first turbines for Le Marinel are presently being assembled.

UNION OF SOUTH AFRICA—*Vaal Reefs Exploration and Mining Company, Ltd.* is expected to initiate trial milling in its gold reduction plant by the end of this month. Erection of the uranium plant is nearing completion.

FEDERATION OF RHODESIA & NYASALAND—*Mineral Search of Africa Ltd.*, a subsidiary of *Rio Tinto Ltd.*, is now interested in the nickel deposit at Ingondama, 40 miles southwest of Gatooma in Southern Rhodesia, which was discovered by M. J. Leslie. The option agreement provides that the claim area covering this deposit will be acquired for £320,000 if investigations confirm earlier estimates.

SOUTH WEST AFRICA—*Kimberley (West) Diamond Corporation Ltd.* reports that a new diamond field has been discovered in the Kaokoveld, south of the Kunene River which forms the southern border of Angola. The stones are mostly industrials of very good quality. Geologists believe that these diamonds, which are found at comparatively shallow depth, come from an inland source and efforts will be made to trace this source in an attempt to find a pipe. Meanwhile, the company believes the discoveries warrant an application for a mine lease and such an application will be submitted to the South West African administration.

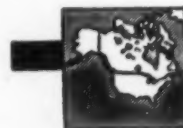
FEDERATION OF RHODESIA & NYASALAND—*Rhodesian Selection Trust Exploration Ltd.* has been conducting investigations on a variety of projects in the Federation which involve apatite, tungsten, ilmenite and rutile, gold, copper, chrome, asbestos, tin, nickel, monazite, beryl, and lead. Headquarters of the exploration company's field organizations have been established in Salisbury and a technical staff hired. These activities are in addition to the long-term prospecting program which the group is carrying out over concessions covering about 41,500 square miles of Northern Rhodesia. These prospecting activities are under the control of companies especially formed for that purpose.

UNION OF SOUTH AFRICA—Modification of the expansion program of *Mallin Diamond Ltd.*, subsidiary of *Carrig Diamonds Ltd.*, to a treatment rate of about 12,000 tons monthly of Kimberlite from the present rate of about 6,250 tons will result in a reduction of

expenses from £250,000 to £200,000. The new secondary crushing plant has been commissioned and is achieving much finer crushing of the ore. The lease payment to the government has been reduced from 5 to 2.55 percent.

BELGIAN CONGO—The unsatisfactory price of gold has caused some gold producers to cease production and others are threatened with similar action. One counteracting measure has been taken by the government in suppressing the export duty on gold ores which amounted to 6.0 percent. The measure was effective on October 1st, and was retroactive to January 1, 1955.

FEDERATION OF RHODESIA & NYASALAND—In Northern Rhodesia, 100,000 native mine workers will shortly be granted increases in pay in lieu of the rations which have hitherto been issued and in place of free accommodation. The object is to instill a greater sense of responsibility, together with greater control over their own money, and to deprive a number of loafers of free meals. The plan will go into operation as soon as adequate shopping facilities have been provided. In Southern Rhodesia, the Chamber of Mines has canvassed its members on the subject of pension plans for native employees. Up to now, there has been no regular gratuity program for old employees other than that of "making jobs" for them as watchmen, etc. The majority return to their kraals. It has yet to be decided whether any gratuity shall be paid in a lump sum or doled out from time to time, but there are difficulties involved in the latter arrangement in view of the widely scattered and often inaccessible native villages.



NORTH AMERICA

BRITISH COLUMBIA—*Bunker Hill & Sullivan Mining and Concentrating Company* of Kellogg, Idaho has optioned 53 zinc-lead mining claims on the east side of Duncan Lake about 30 miles north of Kaslo. This marks Bunker Hill's first entry into the British Columbia mining area. The claims were optioned from Joe Gallo and associates of Howser, B. C. Diamond drilling and possibly other exploration work is planned for this summer. The firm made a preliminary examination last fall.

QUEBEC—*Rio Canadian Exploration Ltd.*, a subsidiary of *Rio Tinto Ltd.*, is continuing its drilling program in the Clercy area about 10 miles northeast of Noranda. Core assays continue to give good showings of copper, zinc, gold and silver. Meanwhile, *Rio Tinto* which is a London firm is negotiating with the Canadian mining interests controlled by Joseph Hirshhorn regarding the transfer of the Canadian mining assets to a new holding company.

ALASKA—Mr. and Mrs. Les Hollenbeck have signed a contract with *Union Carbide Nuclear Company* of Grand Junction, Colorado for exploration of three uranium claims adjoining the *Ross-Adams* uranium discovery on Moira Sound near Ketchikan. The *Ross-Adams* claims were the first uranium-bearing claims to be located in the area and

INTERNATIONAL

touched off a wave of prospecting. *Climax Molybdenum Company* of Grand Junction is exploring this discovery.

NOVA SCOTIA—The *Mineral Exploration Corporation* (Minex) reports a sizeable zinc deposit at its property on Cape Breton Island, and consideration is being given to construction of a zinc smelter. The zinc deposit has been outlined by underground and surface work at the Meat Cove portion of the 1,000,000-acre concession. To the southwest of Meat Cove is another area called Rocky Brook where prospect diamond drilling is underway; copper-zinc zones have been traced.

ONTARIO—*Faraday Uranium Mines*, which holds 2,600 acres in Faraday township in the Bancroft area of northern Ontario, has completed negotiations for sale of uranium concentrates to the government-owned *Eldorado Mining and Refining Company* up to a value of \$29,754,800. To meet this contract, the company is proceeding with shaft sinking and will build a 750-ton daily mill. *Newkirk Mining Corporation* holds a controlling interest in Faraday.

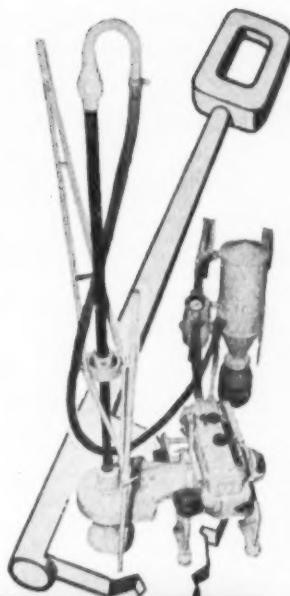
BRITISH COLUMBIA—*Slocan Van Roil Mines Ltd.* has started work on a winze in order to reach a shoot of silver-lead-zinc ore found by diamond drilling below No. 10 level. Production from leas-ing operations in upper levels continues at about 300 tons of hand-sorted ore monthly. The company has rehabilitated its mill at Silverton, B. C., for operation on a custom basis; larger flotation cells were installed to handle the anticipated higher sulphide content of hand-sorted custom ores.

QUEBEC—*Eastern Asbestos Company* will construct a 200-ton mill at its Ottawa Valley asbestos property, 24 miles from Buckingham. Cost of the mill is not expected to exceed \$300,000 since the ore is amenable to fairly simple treatment. Initial mill rate will be about 100 tons per day from four drifts and raises which will be driven simultaneously. Underground development is continuing on the four zones outlined to date.

NEW MEXICO—*Illinois Zinc Company* reports that its *Kearney* zinc mine near Silver City, is now operating at capacity. Ore is shipped to the company's concentrator located at Deming, New Mexico. The Illinois Zinc subsidiary, *Shannon Mining Company*, is stepping up operations at its *Shannon* mine near Gleason, Arizona. High-grade copper is being produced and plans are being made to increase shipments to the smelter. Both properties were reopened in 1954.

BRITISH COLUMBIA—Management of *Highland-Bell Ltd.* expects a "long shot" exploration project to pay off soon, and an ore bunker is now being built to serve a new mile-long adit at 2,900-foot elevation. The new ore source was found by deep diamond drilling based on a geological theory that the continuation of the ore zone in upper levels might be found at increased depth of 700 feet under its displacement by a fault. D. F. Kidd is geologist and O. S. Perry is mine manager of the operation.

QUEBEC—*Chibougamau Explorers'* new 500-ton mill in the south Chibougamau area is going through a shake-down period after completion of installation of major equipment. The mill is designed so that it can easily be expanded to 750 tons daily when necessary. This is the third producer for the Chibougamau copper camp. *Opemiska Copper Mines (Quebec) Ltd.* was the first in December



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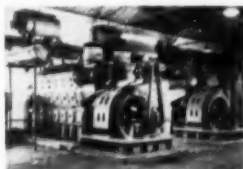
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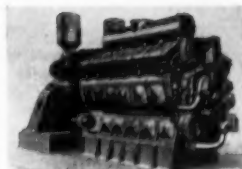
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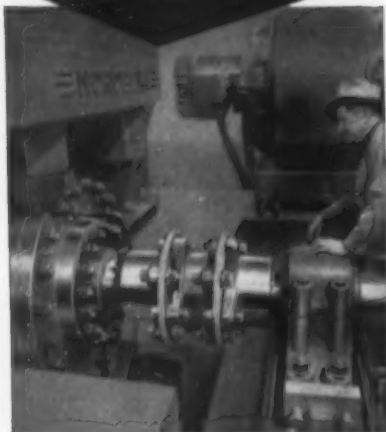
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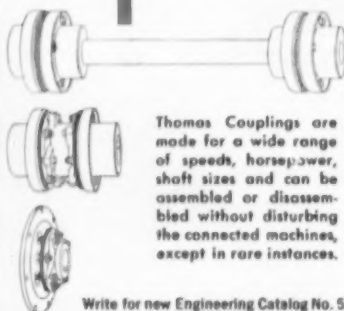
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INTERNATIONAL

1953, followed by *Campbell Chibougamau* in May 1955. *Anacon Lead Mines* owns controlling interest in Chibougamau Explorers.

NORTHWEST TERRITORIES—*United Uranium Corporation* has started a program of underground diamond drilling on its property at Hottah Lake some 200 miles northwest of Yellowknife. Two drill stations will be established on the 150-foot level from which a series of test holes will be drilled to test extensions of favorable structures on the 300- and 450-foot horizons. The shaft will be deepened to 500 feet with two new levels added if drill results are favorable.

ONTARIO—A milling plant to treat radioactive rare earths is being built by *Tuc Metals Mines* at its property in Dryden Township southeast of Sudbury. The mill will have an initial capacity of 15 to 25 tons per day, but can be expanded to 50 tons if warranted. Mill feed will come from an old dump left over from former feldspar operations, and estimated to contain about 10,000 tons.

UTAH—*Westmont Exploration Ltd.*, in which the *New York-Alaska Gold Dredging Corporation* of Seattle and *Pioneer Gold Mines of B. C. Ltd.*, among others, are reported to have an interest, is currently conducting an exploration program adjoining the *Happy Jack* mine in the White Canyon district of Utah. Called the "White Canyon Project," the company is currently driving a 5,000-foot exploration drift, of which over 1,800 feet have already been completed. The company is said to own 51 claims in the area.

QUEBEC—*New Hosco Mines* plans to undertake an extensive exploration program at a base metal prospect in L'Esperance township midway between Bachelor Lake and Opemiska districts. The company staked 45 claims in this area last fall, and located the presence of sulphides in preliminary work. The firm also plans to work on a 12-claim copper-nickel prospect in Widdifield township, Nipissing district, Ontario, when weather conditions permit.

MANITOBA—*Sherritt Gordon Mines Ltd.*'s shipments to *International Nickel Company of Canada, Ltd.* have ceased with the expiration of its contract at the end of January. Sherritt Gordon had been shipping 100 to 125 tons of nickel concentrates daily from its *Lynn Lake* mine; the Sherritt Gordon refinery at Fort Saskatchewan had been treating concentrates at a rate of 18,000,000 pounds of nickel annually. Plans are now under consideration for increasing output to 20,000,000 pounds annually, with similar increases in other products—copper, cobalt, and fertilizer to 10,000,000 pounds, 350,000 pounds, and 70,000 tons a year respectively.

ONTARIO—*Lake Nordic Uranium Mines Ltd.* is considering erection of a 1,500-ton-per-day mill at its property in the Algoma district. *Kilborn Engineering* would design the mill. At the mine site, temporary plant construction is well underway, and the mine shaft has been collared. Negotiations are currently underway with the government-owned *El-dorado Mining and Refining Company* for a special price contract for the sale of uranium concentrates.

BRITISH COLUMBIA—*Salmo Prince Mines Ltd.* plans construction of a 500-ton concentrator at its copper property near Greenwood. Shareholders have authorized sale of 2,000,000 additional shares in order to finance the mill and

get into production. Diamond drill crews have outlined nearly 500,000 tons of copper ore, according to company officials.

ONTARIO—*Pater Uranium Mines Ltd.* has its shaft sinking and underground development program ready for an early start, and now announces a new program of diamond drilling—this time from the ice of Lake Huron. On surface Pater Uranium is sinking a shaft to a depth of 1,000 feet, and will undertake 3,000 feet of lateral development at the 500 to 1,000 levels. Cost is \$500,000. On the ice, Pater is setting up a diamond drill to test an electromagnetic anomaly located under the waters of Serpent Harbor and off-shore from its copper property in the Algoma district. To date, Pater has disclosed 775,000 tons of ore by diamond drilling on land; the ore reserves average 2 percent copper and 0.14 percent cobalt. In addition, another 250,000 tons of lower grade ore were estimated west of the outlined ore body. Last spring, Pater also acquired License of Occupation of 525 "ice" acres adjoining its property when a geophysical survey on a portion of this "water lease" revealed a conductor parallel to the known sulfide orebody on shore.

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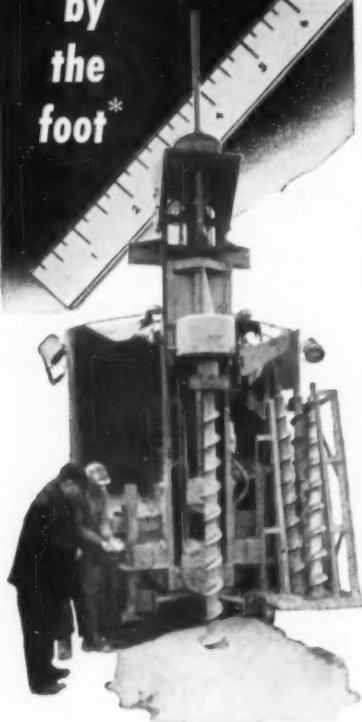
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**What For
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MEASURE DRILLING SAVINGS

by
the
foot*



McCARTHY NEW HEAVY-DUTY VERTICAL AUGER DRILL

*Strip Miner Drills 8-1/2" Blast Holes 60 Ft.
Deep in 1 Hour, Including Moving Time.

Savings, like costs, are measured by the foot, especially in tough earth and rock formations. Using the new McCarthy 106-24 Vertical Drill, this Pennsylvania strip miner cut drilling time to 1 hr. per hole (including moving time) on 60-ft. blast holes 8 1/2" in diameter. Formation was 20 ft. of soft top strata, 35 ft. sandstone and 5 ft. of hard sandstone and bastard limestone.

A new speed reducer on Model 106-24 slows auger rotation for drilling harder rock formations. The result is more torque, or "biting power." You have fewer bit failures, cutting over-all drilling time. Driller above used tungsten carbide bits.

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Write for Bulletin M-100



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INTERNATIONAL

QUEBEC—Indian Lake Mines has acquired a copper property in the Opemiska-Chibougamau area and is preparing to launch a drilling program shortly. The property is one mile east of Opemiska Copper Mines' producing copper mine, and the geological similarity of the two properties has led to hopeful speculation on the part of the new owners. Indian Lake Mines recently changed its name from Indian Lake Gold Mines Ltd., after amalgamating with United Mic-Mac Mines Ltd.

NEW YORK—Sixteen companies prominent in the mining field have been certified as "Excellent Managed" by the American Institute of Management. These are: The M. A. Hanna Company, Freeport Sulphur Company, American Metal Company, Consolidated Mining & Smelting Company of Canada, Homestake Mining Company, Hudson Bay Mining & Smelting Company, Ltd., International Nickel Company of Canada, Kennecott Copper Corporation, National Lead Company, New Jersey Zinc Company, Newmont Mining Corporation, Noranda Mines, Ltd., Phelps Dodge Corporation, St. Joseph Lead Company, Texas Gulf Sulphur Company, U. S. Smelting, Refining & Mining Company.

ONTARIO—Canadian Johns-Manville Corporation set a record in 1955 with a total asbestos production of 592,000 tons from the firm's Canadian mines. The company's main producing mines are at Asbestos, Quebec where the Jeffrey mine is the largest asbestos producing mine in the world.

BRITISH COLUMBIA—Consolidated Mining and Smelting Company of Canada has done more than 10,000 feet of diamond drilling at the Ainsworth property of Western Mines, Ltd. If continued favorable results are obtained from additional drilling, the old Kootenay Florence workings would be extended 2,000 feet to explore the Lakeshore limestone belt.

NOVA SCOTIA—Magnet Cove Barium Corporation of Houston, Texas has purchased Canadian Industrial Minerals Ltd. whose property includes the large barite mine at Pembroke Nova Scotia, and 400-ton mill at Walton. Magnet Cove is a subsidiary of Dresser Industries.

NEWFOUNDLAND—Buchans Mining Company Ltd. reportedly plans to sink a new production shaft for deeper development and mining of silver-lead-zinc-copper ore in the Buchans mine. The present Rothermere shaft is down to 2,513 feet; the new shaft is planned for 4,000 feet.

QUEBEC—A new company has been formed to explore and develop the asbestos claims on Asbestos Island in the Chibougamau district. The claims had been held on option by Quebec Chibougamau Goldfields which decided to exercise the option and form the new company. It will be known as Chibougamau Asbestos Ltd.

BRITISH COLUMBIA—Copper production is getting under way at the Velvet mine near Rossland by Mid-West Copper Uranium Mines, Ltd. Underground workings have been rehabilitated, a diamond drilling program undertaken, and a new mill unit added to bring capacity to 100 tons daily. Plans call for production of a gold-copper bulk concentrate which then would be separated by flotation, with copper going to the smelter at Tacoma, Washington, and gold to Trail, B. C.

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Breyer Report

Continued from page 48

and/or build entirely new plants. New construction costs you five to seven times as much as it used to. That's the middle line. While that line as actually depicted on this chart is the McGraw-Hill construction cost index curve for all types of construction, we have checked its application to new metallurgical construction in a wide variety of metal industries and in a wide variety of plant locations. The figures still come out about on an average of six to six and one-half times today what they were when the inflation began. To illustrate my point, Anaconda Company's original electrolytic zinc plant (1916) at Anaconda, Montana, cost roughly \$45.00 per annual ton of production. Today our figures for electrolytic plants in a variety of locations in the United States and Canada run between \$275.00 and \$335.00 per annual ton.

It is also obvious from this chart where the bulk of the dollars realized from the sale of the metal goes. It certainly does not land in the corporate treasury, and, further, what does land there, after taxes, is not enough to buy a new plant that costs six times what the old ones did or even three or four times what the old ones did.

Construction money is increasingly coming from the places where it must come; namely, the savings banks, the insurance companies, the trust funds, etc., where labor, both white collar and shirt sleeve, has deposited it.

The only line on that chart that gives the zinc man an even break is the one marked "Index of Commodities, Wholesale Prices." To the metal or concentrate producer that means supplies. He can get just about as many supplies of all kinds in swap for a ton of zinc today as he could 40 years ago, but supplies today are differentially a very minor element in zinc smelter economy as compared to the payroll item.

The basic merit of these two charts combined is that they not only depict where your trouble is today, but they show that that trouble has been building up for 40 years. The forces at work have momentum, they are not just of today or last year. With that much history behind the data, it is a pretty safe bet that unless the economics are changed by politics, the overall problem of the zinc industry will continue to worsen, and at an accelerated rate. It is my opinion, based first on the record of previous inflations the world over, but based more particularly on the average United States working man's experience over the past 40 years, that it is politically impossible to change very much the slope of the curve of the accelerating increase in the cost of the consumed labor hour. The American worker, in whatever category you find him, has over the past 40 years found each year, or very nearly each year, that he works fewer hours, and gets more dollars, per day. He has been warned again and again over that 40-year period with the cry of wolf that "you cannot keep it up." But there has come no wolf and now he does not believe there is any wolf. He is going to keep on demanding more dollars for fewer hours until the final day when the dollars will not buy him anything. Any politician who tries to sell Joe Doakes a contrary idea will not get elected, or if elected will not stay in office long either here or anywhere else in the world where they hold real elections.

If the above is the situation, the price of zinc must be made to go up with the price of the consumed labor hour, factored wherever it is apparent by the gains due to technological improvement. This is not fomenting or forwarding inflation. It is simply recognizing that it exists and that its most immediate manifestation is had in the payroll. Unless the metal industry wishes to suffer differentially with respect to other groups of citizens, they had better recognize and act in accord with the

realities of fiscal life in an era of inflation rather than go down with the horse and buggy.

To show you that the story as told for zinc is no different from the story of copper, I call your attention to Chart No. III. As you can very readily see, the same squeeze is on copper as on zinc. I could show you one for each of the other common metals in turn, but they are monotonously alike.

The next chart, No. IV, shows the history and growth of the so-called "fringe benefits" and a breakdown of the components. One is for steel, and the other for zinc. On zinc, we have quite accurate figures. While I have no such fringe figures for mining and milling, there must be a number of you who do have them, at least in mind, if not in graphic form. I think they will correspond pretty closely to those that I do have, but if your figures differ materially, I would be happy to have you send me the figures and I will incorporate them in a third set of charts covering fringe in mining and concentrating labor costs.

We could discuss the significances of these "fringe benefits" for hours and with considerable benefit. It is obvious to anyone who has studied them, however, that they have implications, social as well as financial, far beyond the fact that they now constitute roughly 20 percent of the total cost of the consumed labor hour.

I have spot checked with a few mining companies the fact that the history of the cost of the consumed labor hour in mining and milling parallels quite closely that for smelting labor. There are not too many mines and mills that have their records in such shape and accessibility that a good history can be made, but C. V. Burns, vice president-controller of the American Zinc, Lead & Smelting Company, has worked up for me the index history for the Tennessee operations of that company, which is shown in Table No. I. You can see that if I chart these figures they will very closely parallel the curves shown for the smelting industries. If there are any differences between mining and smelting figures, my spot checks indicate that they can only be minor and not sufficient to vitiate the conclusions that we may draw from using the smelter figures.

The broadest conclusions that I draw, after mature consideration, from all my charts, the ones presented here and many more not shown, are:

1. That the paper price of the common tonnage metals will continue to rise in the future with the rise in the total cost of the consumed labor hour.

Continued on page 83

Table No. I
AMERICAN ZINC COMPANY OF TENNESSEE
1600 Paul Brown Building
St. Louis 1, Missouri

Index of Common Labor and First Class Electrician Wage Rates as of December 31 for the Years 1916 through 1955, Actually Used in Our East Tennessee Mining Operations

At Dec. 31	Common Labor*	Electrician Rate*	At Dec. 31	Common Labor*	Electrician Rate*
1916	100	100	1936	200	183
1917	100	100	1937	273	220
1918	150	147	1938	233	200
1919	150	147	1939	273	220
1920	187	167	1940	330	238
1921	150	135	1941	370	258
1922	150	135	1942	370	273
1923	150	135	1943	387	350
1924	150	135	1944	387	350
1925	150	135	1945	510	350
1926	150	135	1946	510	412
1927	150	135	1947	593	453
1928	167	150	1948	677	495
1929	167	150	1949	743	495
1930	167	150	1950	823	568
1931	167	150	1951	917	615
1932	167	150	1952	930	622
1933	200	183	1953	897	605
1934	200	183	1954	890	602
1935	200	183	1955	957	655

* 1916 arbitrarily selected as the base index of 100.

Breyer Report

Continued from page 82

2. A rise in metal prices will follow more quickly in the future, after a labor cost rise, than it has in the past, because of the squeeze.

3. That the size of plants and installations have about reached their maximum from the standpoint of the effect of size on production costs.

4. That technological improvement, brought about through research and development, is the sole present reliance against the increasing squeeze of labor costs on metal prices.

5. That the value of mineral reserves in the ground will steadily increase in terms of dollars, but not necessarily in terms of real value. An ore sale for fixed dollars paid now with delivery of ore against it in the future is a good one. A sale of ore now with fixed dollar per ton payment in the future is not good.

Back to my thesis! If the government can hold the price of metals in terms of cents per pound, it can control the price in terms of labor hours purchasable for a ton of metal. I am not suggesting that the government can hold the selling price of labor hours; far from it! I am only suggesting that it can vary the price of metal with the variation in the selling price of the labor hour. I will make no argument for any specific type of control. I will simply state that all the world uses government controls effectively against us in the interest of its metal producers. History indicates that the best way to fight fire is with fire.



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MULTIPLE HEARTH FURNACE

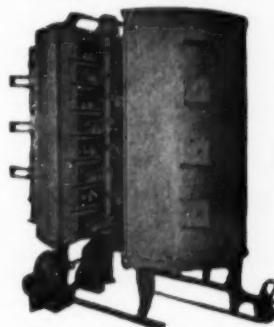


SIZES 8' 6" TO 22' 3" DIAMETER
NUMBER OF HEARTHS, 1-16

ROASTING CALCINING DRYING

ZINC ORES	QUICKSILVER
IRON ORES	MAGNESITE
COPPER ORES	LIMESTONE
TIN ORES	MOLYBDENUM
NICKEL ORES	BONE CHAR
LEAD ORES	DIATOMITE
SODA ASHES	LIME SLUDGE
FULLERS EARTH	MAGNESIUM
CARBON	CLAY GRANULES
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Standard Uranium

Continued from page 39

increased the overall efficiency of the gismo unit by at least 30 percent.

From the transfer raises on the lower level a two-man train crew taps the chutes and trams the ore over 2,400 feet to two 100-ton surface bins. A train is made up of six 3-ton Cranby mine cars, made by C. S. Card Iron Works, hauled by a 6-ton Mancha locomotive powered by a 67-horsepower Diesel engine. The bottom of the haulageway is well ballasted, and track and ties are kept in excellent condition for top efficiency. The ore is trucked 41 miles to the Moab buying station by contractors.

Roof Bolting

Temporary support for the back is provided by rock bolting. Here again the tendency is to specialize. One two-man crew usually handles this assignment. Wire netting or surplus landing mats are quite popular rather than headboards. A converted stoper mounted on a telescopic leg is used for rockbolting purposes. Near the edge of the deposit where ore thins out to less than the required 7% feet, slushers will be installed to reclaim broken ore.

Pillar Recovery

The pattern of mining after completion of strike drifts and laterals will leave a series of pillars 50 feet

long (measured along the strike axis) by 20 feet wide. If a block of ground extending across the deposit between two laterals is considered as a panel, then approximately 68 percent of the ore in the panel is recovered by the room and pillar method. This assumption is based on a nearly uniform thickness of the deposit, however. Approximately 32 percent of the ore remains in pillar-form in the panel, and recovery becomes an important factor in the overall mine picture.

Panel Retreat

Preliminary planning is to recover the pillars in each panel in an operation which retreats toward the service incline, branching off the haulage adit. It will be possible to retreat from both the northwesterly and southeasterly end of the orebody to the incline simultaneously. Starting at the end panel, the two outside pillars will be sliced down in a series of slabbing rounds and recovered. The ground in this area will be allowed to cave and stabilize. Work will then progress to the inside pillars in the panel which will be cut down in size in a manner similar to that employed on the boundary pillars. Should the ground fail to reach equilibrium or the openings get so wide that the back becomes too heavy to safely work, any ore remaining in unrecovered pillars near the center of the panel will be temporarily abandoned.

The mining operation will then shift to the next panel which will be handled by the same procedure—that is, recovering the outside pillars while advancing to the middle of the panel from both sides. It is entirely conceivable that the recovery method will result in a checkerboard pattern of unmined pillars which were, of necessity, temporarily abandoned.

Undercutting

The final step will be to put up development raises under those pillars or portions of pillars which are not reclaimed in the panel retreat method. These raises can be started from the haulage drifts, and the pillar undercut by long-holing and caved into the development raise. How much undercutting will have to be done, of course, is unknown at this time. A great deal will depend on whether the quantity of ore remaining in a zone is sufficient to warrant the necessary development raise and undercut workings. This same type of pillar recovery has been applied with nearly complete extraction of pillars at some of the Pioche ore bodies of Combined Metals Reduction Company, according to Standard's superintendent Robert Durk.

The mine, the equipment, and the methods used at Standard Uranium are all highly interesting and unusual. Mine mechanization commensurate with the size of the operation makes this one of the truly outstanding uranium mines on the Colorado Plateau.

Four Corners Uranium

Continued from page 43

room. The HD-5 has proved readily adaptable to uranium mining, and it performed well under the difficult conditions at this mine. It had to climb over 150 feet of steep grades with each bucket-load, and this included a switchback. J & M has now obtained a shuttle car which has been placed in service for hauling ore from the mine working to the surface.

No surface plant has been installed at this mine; the ore is simply stockpiled to be picked up later and loaded on trucks.

The longest incline shaft on the

Colorado Plateau was driven by Monogram Uranium & Oil Company to reach the ore body 135 feet below the surface. The opening is 529 feet long with a cross section which measures nine by nine feet inside the timbers. During the sinking operation a lightweight, Cleveland rock drill mounted on an airleg was used. Development rock was mucked by an Allis Chalmers HD-5 Tracto Shovel which backed up the 29 percent incline with each load. At the surface, two 30-ton steel ore bins are installed in line with the incline. Waste was

used to build a road from the collar of the incline to the top of the ore bins.

After stoping in ore started, a rebuilt Dodge truck, powered by a Diesel engine, was converted to shuttle car service. Total payload capacity of this unit is three tons.

The Future

As drilling and exploration continues to the south there is an excellent chance that several new deposits will be disclosed thus assuring Four Corners of continued production from the district. New prospects are constantly being examined elsewhere. Four Corners which grew up with uranium is in the business to stay.

Fletcher Report

Continued from page 50

tect an essential industry of our own.

In conclusion, let me apply a yardstick to the solution offered by the automatic import tax. Is it effective? Yes, possibly not as effective as quo-

tas, but at least as effective as a tariff. Is it automatic? Yes, the mechanics could be clearly stated, easily understood, and would operate smoothly. Is it fair? Yes, because it protects the

domestic miner, but does not penalize needed foreign production. It will sustain about the present market, and will increase market stability. Is it feasible? Quite likely. Only we, by our own efforts, can bring about a "yes," or fumble into a "no" to that last question.

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill or smelter. This PEP section is MINING WORLD's way of making available to you some of the finest current information on mechanization.



Portable Skyhook Can Be Used Almost Anywhere

The Magic-Pole Tripod, manufactured by the B. E. Wallace Products Co., adapts itself for use indoors or outdoors, in almost every type of terrain. Built to hold up to three tons, the 66 pound unit features telescoping legs which enable it to be set up in ordinarily difficult circumstances. This economical unit has an anti-friction base, which enables it to hold on smooth surfaces, as well as rough ones. The company also manufactures one- and two-pole units with guy lines. Circle No. 66 for additional information.



Versatile Scintillation Counter Assays Ore at Site

Catham Electronics, Division of Gera Corp., introduce the new Catham Scintillation Counter SC-102. This new counter features extreme sensitivity which enables it to respond to radiation at distances greater than 300 feet above the ground and in planes it will respond efficiently at speeds up to 175 miles per hour. The SC-102 is suited for assaying ore samples, oil prospecting, and well logging. Engineered for rugged field use, all sensitive and delicate electronic components have been shock mounted and

protected by non-breakable casing and high grade aluminum. Waterproof seals and hermetically sealed meter enable this instrument to be used under adverse climatic conditions. Circle No. 72 for more information.



A New Type Of Transport For Off-Road Commerce

The new Le Tourneau Cross-Country Freighters represent a concept of locomotion which holds that total motive power should be distributed under total load. Electric power is used for convenient, flexible distribution; and every wheel becomes a driver by virtue of a powerful electric motor and gear reduction built with its rim.

One car carries an electric generating plant which supplies energy to all wheels. Then, no matter how many cargo cars are coupled together to make up a "train," each one carries its own load; none is pushed or pulled by an independent prime mover. However, because the cars are coupled mechanically as well as electrically, the wheels reinforce each other. Because driving power is present at every point of surface contact, LeTourneau Cross-Country Freighters go over, across, or through obstacles impassable to many other types of vehicles. For descriptive bulletin circle No. 9.

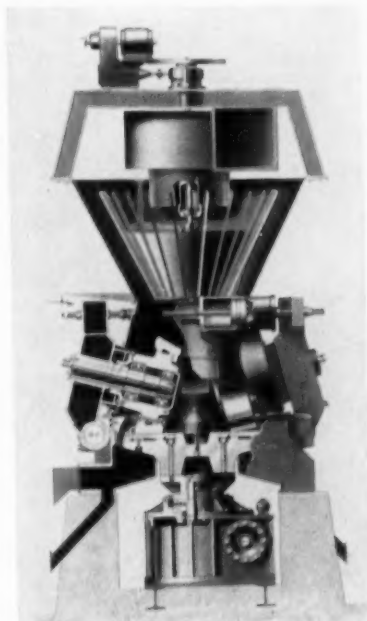


New Super Duty Trucks In Production By Mack

The most rugged Macks of their size ever built, the new B-80 line designed especially for heavy construction and other rigorous duties, have begun rolling

off the company's Allentown, Pa., assembly line.

The new series will include 11 models, all featuring extra strength and power, from their square-cut military front fenders and bumpers to their Mack Balanced Bogies. These super-strength models have large section heat-treated alloy steel frames which are double-channelled from end to end. On long wheelbases, heavy fishplating is available where required. All have exposed radiators with bolted top and bottom tanks and extra strength flat top fenders. A choice of gasoline or Diesel engines ranging from 170 to 300 hp is available. Circle No. 69 for further information.



Hardinge Introduces New Disc Roll Mill

At the 25th Exposition of Chemical Industries in Philadelphia, Hardinge Co., Inc., displayed for the first time in the United States the Disc Roll Mill.

The new Disc Roll Mill is a roller-type mill based on the "Loesche Mill", originally developed in Germany and well-known throughout Europe. The American counterpart includes improvements which enhance its value and usefulness, such as the Hardinge "Gyrotor Classifier" and pneumatic roll pressure control.

The Mill is particularly suited for grinding relatively soft minerals such as limestone, phosphate rock, bauxite, talc, clays, celestite, gypsum, raw cement mix, sericite and the like. Circle No. 77 for additional information.



Mighty Midget Drill Vacuum Cleans Hole

The Houston Tool Co. have now available the Mighty Midget Portable Rotary Exploration Drill. According to the manufacturer, the Mighty Midget will drill over 100 ft. by vacuum, in dry formations without the use of water. All drill cuttings are removed from the hole by vacuum. Designed for all types of rotary drilling, the drill is powered by a 9 hp, 2 cycle McCulloch gasoline engine. This engine is not affected by altitude. By interchanging vacuum pump with a water pump the Mighty Midget can easily be adapted to coring with diamond bits, drilling both wet, and by vacuum. Note in photograph excellent stratification of drill cuttings. Changes in ground formation may be measured quite accurately. Circle No. 68 for additional information.

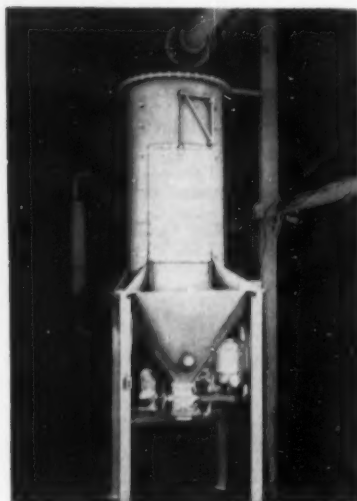


Largest Hyster Lift Truck Features Operating Ease

Availability of a compact and highly maneuverable lift truck of 20,000 lbs. capacity at 24-inch load centers has been announced by officers of the Hyster Company. Complete driver "feel" of the 10-ton-capacity truck in all-weather conditions has been created by convenient, easy to operate controls, and an exceptional degree of visibility.

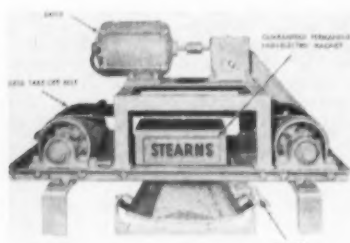
Maximum stability and rigidity under capacity loads is the result of Hyster's overhead tilting mechanism and new heavier-duty uprights. The TC-200 is gasoline-powered, although optional Diesel power is available, the new lift truck has a travel speed of more than 20 mph in either forward or reverse.

Center-point steering and sharp outside turning radius of 179 inches create a high degree of maneuverability. Complete specifications are available by circling No. 67.



New Power-Driven Dust Collector Introduced

A new power-driven dust collector and fractionator has recently been introduced by Majac, Inc., Sharpsburg, Pa. The collector functions by discharging incoming dust-laden air or gas against rotating deflector plates which are mounted on a power-driven shaft. This reverses direction of air-flow, dropping out heavier particles. The air or gas then continues upward through a series of rotating separator blades and additional material is thrown out. The small fraction of dust which finally passes the multiple blades is thrown against outer shell by centrifugal force, and discharged through adjustable slots to bottom of machine. The machine can be operated either as a dry or a wet collector. Circle No. 64 for further information.

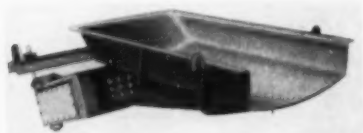


Stearns Announces New Self Cleaning Magnet

Stearns Magnetic, Inc., Milwaukee, Wisconsin, manufacturer of Electro and Permanent Magnetic Separation and Transmission Equipment, has introduced a new line of "Discardo" Cross-belt Magnetic Separators that remove tramp iron and automatically discharge it away from the flow of material in a continuous operation.

Suspended above a conveyor belt, chute, or sorting table, the Alnico V

permanent magnetic components of the "Discardo" create a deep, powerful magnetic field that pulls dangerous tramp iron out of the material flow. Contaminating iron is attracted to the magnet face where a cleated endless belt automatically carries it out of the magnetic field to discharge harmlessly away from the conveyor or chute. Frequent magnet inspection and hand cleaning are eliminated. Circle No. 4 for further information.



Dust-Tight Design Now On Syntron Vibratory Feeder

For complete protection against dusty atmosphere and supply hopper spillage, a new optional dust-tight design feature has been incorporated in the F-55DT Vibratory Feeder manufactured by Syntron Company, Homer City, Pennsylvania.

Total enclosure of the magnet and leaf springs can now be furnished with the F-55DT Heavy Duty "Vibra Flow" Feeder. This added feature prevents any dust in the air, or spillage from a supply hopper, to impair the smooth feeding action of the electromagnetic motor drive.

Equipped with a 48-inch by 60-inch flat pan trough, the F-55DT has a maximum capacity of 500 tons per hour. Circle No. 75 for additional information.



Uranium Test Kit For Do-It-Yourself Fans

Become your own uranium assayer with a "Standard Uranium Ore Sample Kit." This kit, produced by the Menlo Park Research Laboratory, Calif., enables anyone to determine the percentage of uranium in an unknown mineral specimen.

The kit consists of a known sample of uranium, the uranium content of which has been precisely determined by certified chemical assay, in a special container, percentage chart, and empty sample containers.

When an unknown sample is read with either a geiger or scintillation counter and compared with the known sample, a quick glance at the chart will give you the percentage of uranium. No calculation is necessary as all computations have been included in the chart. Circle No. 73 for further information.

C&D SLYVER-CLAD Batteries give you more power per cubic inch of battery. New type of battery plates give extra life and power to the Battery. An outstanding type of plate insulation virtually eliminates shedding and sedimentation. Circle No. 1 for further information.

NEW DRILL CATALOG: The Acker Drill Co., Inc., have a new drill supplies catalog available for you. The catalog illustrates and describes over 150 drilling tools and accessories for core drilling, soil sampling, and auger boring. Circle No. 2 for your free copy.

SHEAVE BLOCKS: Alloy Steel & Metals Co. now has available a new bulletin (No. 271) which describes their line of PACIFIC Sheave Blocks. Featured are Half Plate and Full Plate models in 8, 10, and 12-inch sizes with variety of suspensions. Also included are Carrying Blocks, Utility Blocks, and Sheave Anchors. Circle No. 4 for your copy.

HOISTING EQUIPMENT: Vulcan Iron Works of Wilkes-Barre, Pa. has available a hoisting equipment bulletin (A-483) which pictures its line of electric hoists and skips. Skip descriptions range from the automatic bottom-dump skip for high-speed, balanced hoisting to the three-deck man cage with pneumatic-tired guide wheels. For your copy of this bulletin, circle No. 5.

MAINTAINING POWER BATTERIES: Exide Industrial Division of The Electric Storage Battery Co. has a manual available entitled "Maintaining Motive Power Batteries." All operators of battery-powered mine locomotives will want a copy of this informative manual. Circle No. 6.

SINTERING AND PELLETIZING: Dravo-Lurgi sintering and pelletizing machines, built in Dravo's plant to American standards, are said by the manufacturer to be the most advanced machines available today. Complete information is available on the line of Dravo-Lurgi machinery for treatment of ore fines and concentrates. Circle No. 7.

MINE VENTILATION BULLETIN: Coppus Engineering Corp.'s Bulletin 130-1 describes the "Vano" and "Ventair" Blowers. Included in the Bulletin are charts and graphs that will help you select the size and type of blower you need for your ventilation requirements. Circle No. 8.

SYMONS VIBRATING SCREENS: Nordberg Mfg. Co. has a wide range of Sym-

on screens and grizzlies available for all types of screening jobs. Screen capacities up to 500 tph may be realized. Fill out coupon on Nordberg ad (p. 21, MINING WORLD-Feb.) and attach to PEP card. Send card to MINING WORLD for the full story.

ALLOY STEEL USERS will be interested in U. S. Steel's T-1 "Construction Alloy Steel." It offers a combination of high tensile and yield strength, good high temperature strength, extreme toughness at sub-zero temperatures and good resistance to abrasion, impact, or abuse. It can be used to reduce weight and lengthen service life. For more information on T-1 steels, circle No. 10.

SOLIDS SEPARATION CATALOG: Hardinge Company, Inc. has published a new, sixteen-page catalog (Bulletin No. 31-E) which describes its line of thickeners, clarifiers, and agitators. The catalog discusses applications and shows construction details for "Auto-Raise" thickeners, circular, and rectangular type clarifiers, agitators, and related equipment. A formula is provided for determining tank diameters of thickeners for any given set of data. Circle No. 11.

"ORIENTED DIAMOND" DRILL BITS: Hoffman Bros. Drilling Co. has a 20-page catalog available which describes its full line of diamond drill bits. Included is a description of the new miniature core bits and reaming shells especially designed for use with small, compact portable rigs which are used extensively for uranium prospecting. "Do's and Don'ts of Drilling" is another feature of the catalog. For your copy, circle No. 12.

SHEAVE AND HOIST BULLETIN: Bulletin No. A-396, available from Vulcan Iron Works, Wilkes-Barre, Pa. gives comprehensive engineering data for the selection of sheaves and electric hoists. If your operation involves hoisting, you will want a copy of Vulcan's bulletin. Circle No. 13.

TRANSISTORIZED GEIGER COUNTER: The "Transistorized Uranium Scout" signals the presence of a radioactive substance such as uranium or thorium ore, by three methods according to the Radiac Co. These methods include the panel meter which reads in percentage of uranium, a neon flashing lamp, and earphones. Another feature of the "Scout" is the variable time-constant control which may be set to correspond to the speed of the instrument over the area traversed. For further information, circle No. 14.

"SHARK TOOTH" DIAMOND BITS: Triangular "Shark Tooth" shaped cutting teeth—each with a sharp cutting edge at the point—give fast, free cutting action at each diamond. According to the manufacturer, American Coldset Corp., these bits offer controlled wear distribution to prevent clogging, a low cutting angle to eliminate shearing-off the cutting points, and flush set diamonds for greater strength. "Shark Tooth" bits are available in three standard cutting patterns which are suited for most general applications. An interesting brochure is available which gives all the details. Circle No. 15.

NON-CHOKABLE JAW CRUSHERS: Traylor jaw crushers have non-chokable, curved jaw plates made of manganese steel and are engineered to provide increased capacity. Packing and choking is eliminated. Gradual wear is evenly distributed over the entire face of the curved jaw plates. The Traylor booklet on jaw crushers fully describes all the features and is available to interested readers. Circle No. 16.

EXTRA-TOUGH CONVEYOR BELTS: Quaker conveyor belts are specially engineered to stand up to rough usage. The cover withstands the shock-impact of jagged ores and gives extra safety against the wearing effects of material caught between the boot pulley and the belt, according to the manufacturer. A brochure fully describing Quaker's line of conveyor belts is available. For your copy, circle No. 17.

"MINERAL DRESSING NOTES" NO. 22: The latest issue of "Mineral Dressing Notes," published in 1955 is entitled "Handling and Feeding of AERO Brand Cyanide." Sections include notes on the properties of this widely used product, transportation, storage, safety precautions, and a description of the various feeding arrangement used at a number of cyanidation operations. Circle No. 18 now for your copy.

DIAMOND BIT CATALOG: Anton Smit & Co., Inc. has a diamond drill bit catalog available which describes its three types of matrices—Ascolite, Nicolite, and Bronzolit. These bits are engineered to give you the maximum footage in your particular type of ground. For your copy of the catalog and price list, circle No. 25.

POCKET REFERENCE: One hundred pages of information, invaluable to anyone in the highway, heavy-construction,

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to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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mining, or other basic industries, is now available free on request in the eleventh edition of **FACTS and FIGURES**, a reference booklet published by Pioneer Engineering Works, Inc. Circle No. 29 for your copy.

UNDERGROUND TV: For the first time, closed-circuit TV installations in mines can be controlled to provide operator safety in hazardous locations, and permit quick and accurate viewing of widely spaced objectives. Such an installation is available from Dage Television Division, Thompson Products, Inc., Michigan City, Ind. Circle No. 31 for further information.

RADIAC TRANSISTORS: The Radiac Company of New York City is introducing a new line of transistorized prospecting instruments for use in locating uranium, thorium, and oil. The instruments, which have just completed extensive field tests, include a transistorized scintillation counter, and three different Geiger counter models. Circle No. 33 for more information.

DRY LUBRICATION: A new, permanent and dry lubrication process called USECO-Lube is now available for application to all metallic surfaces. This new method, by the U.S. Engineering Company, is most beneficial where ordinary oils and greases are not feasible or desirable. Circle No. 39 for further information on this new method.

AIR POWER CAR TRANSFER: The American Mine Door Company has perfected a compressed air operated unit as an addition to its well known car transfer. This air mechanism will transfer a 6-ton load by the flip of a valve handle. The unit is operated by one man, and it is said the operation works 50% faster than with the former model. Circle No. 40 for further information.

HEATING TAPE: A knitted electrothermal heating tape is now available from the Arthur S. LaPine & Company. According to the manufacturer these tapes are both efficient and economical. They are available in widths from 1/2 inch to 3 1/2 inches, in lengths up to 8 feet. These tapes are useful for heating frozen water lines, cold oil lines, pipes, valves, etc. Circle No. 41 for information.

NEW HARDINGE CATALOG: The Hardinge Company, Inc., has recently published a completely new, 16-page catalog describing its line of thickeners,

clarifiers, and agitators, for mining, chemical, metallurgical, and other industrial processing operations in which separation of solids from a liquid is required. Circle No. 43 for your copy.

TRANSISTORIZED COUNTER: The Radiac Company of New York City reports that the first all-transistorized prospector's Geiger counter to feature three methods of radioactivity indication, a continuously variable time-constant control, and a meter which reads in percentage of uranium is now available. Circle No. 46 for details.

CORROSION-RESISTANT PIPE: Two new folders released by Alpha Plastics Inc., West Orange, N.J., give detailed reference information for proper selection of its unplasticized, rigid pvc pipe, where high chemical resistance and/or high impact resistance is desired. The companion folder describes threaded and socket solvent cement fittings recommended for use with the Alpha line of 1/2-inch to 4-inch, 101 and 102 rigid pvc pipe. Circle No. 47 for your copies.

CONE-DRIVE GEARS: Complete engineering details on the assembly procedure for Cone-Drive, double-enveloping, worm gearing are contained in a new 12-page bulletin available from Cone-Drive Gears, Div. Michigan Tool Co. The bulletin covers the latest methods of assembly using taper roller bearings, which are now standard equipment on both worm and gear shafts. Circle No. 51 for your copy.

HYPODERMIC GAUGE: A new pressure gauge for determining available air pressure at point of use has been brought out by U.S. Gauge, Sellersville, Pa., a division of American Machine and Metals, Inc. This air gauge is equipped with a hypodermic needle, and permits tapping the air hose right at the machine to determine working pressures. Circle No. 52 for further information.

ALLOY MECHANICAL TUBING: Product engineers and others whose duties require a knowledge of alloy mechanical tubing will be interested in a recent publication of the Tubular Products Division of the Babcock & Wilcox Company. Circle No. 53 for your copy.

CARBIDE VALVE LIFTERS: Development of a brazing technique recently, in joining cemented carbide to its valve lifters, culminated in an engine component that enabled Mack Truck engines to have increased power output and longer lifter life. Carbide engineers, who developed this method, find that wear is re-

duced and lifter performance increased. Circle No. 62 for the full story.

MICHIGAN TURBODOZER: The Michigan Model 180 Turbodozer is described in a new 20-page booklet recently published by the Clark Equipment Co. It explains how hydraulic controls facilitate easier maintenance; also how the four-wheel drive and rear-wheel steering permit full power on the wheels even when turning. Circle No. 63 for your copy.

AIR TOOL FILTER: An entirely new, light weight, fully automatic and self-adjusting air filter designed for air tools has just been announced by the Emco Pneumatic Corp. It is called the "Emco Jet" Air Filter. This unit weighs only 12 ounces, and prevents foreign particles and moisture from entering air operated tools. Circle No. 22 for further information.

ROCKET LH is a new and improved type of low hydrogen arc welding electrode announced by Hobart Brothers Co., Troy, Ohio. An entirely new formula and the incorporation of iron powder in the coating enables this electrode to be used for welding in all positions, gives more deposited weld metal with a smooth, uniform bead and x-ray quality welds. Circle No. 27 for further information.

INCREASED HORSEPOWER: LeTourneau-Westinghouse has announced a number of changes in engines and horsepower ratings in its line of Adams motor graders. The No. 660, formerly powered by Cummins 140-hp Diesel, is now powered by a Cummins or GM 150-hp Diesel. Other models affected are the No. 550, No. 440, and the No. 330. Circle No. 56 for full details.

SILVER BRAZING ALLOY: Solutions to some of the tough problems in the assembly of dissimilar ferrous and non-ferrous metals are available by the introduction of two special silver alloys announced by All-State Welding Alloys Co., Inc. They are designed for use in joining aluminum, copper, brass, bronze, and combinations of these and other metals. Circle No. 25 for the full story.

PORTABLE CRUSHERS: Denver Equipment Company has published a new bulletin, to present the facts about the Denver Type "J" Portable and Semi-portable Crushing Plants. These plants are rugged, completely self-contained units that can be moved to any crushing job. Circle No. 26 for your copy.

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precipitates—ROCKY MOUNTAIN

**Lucius Pitkin Named
U.O. Ore Buyer**

On February 1, Lucius Pitkin, Inc. of New York City succeeded the American Smelting & Refining Company as contractor for the U.S. Atomic Energy Commission's ore buying activities. The selection of the New York firm climaxed several months of negotiations and evaluation on the part of the AEC to pick a successor to ASARCO who announced early in October that it would terminate its contract.

The new contract between the AEC and Lucius Pitkin is on a cost-plus, fixed-fee basis. The firm will operate a total of nine ore buying stations which are located at Monticello, Marysville, Moab, and White Canyon, Utah; Edgemont, South Dakota; Globe and Tuba City, Arizona; Riverton, Wyoming; and Grants, New Mexico. In addition Lucius Pitkin will assume direction of the concentrate sampling and assay laboratory at Grand Junction, Colorado.

Martin N. Gaines, who was Project Manager for ASARCO's ore buying activities, will direct the Pitkin operations.

COLORADO

The Telluride Mines Inc. mine and mill at Telluride, Colorado are back in operation after a 20-month shutdown prompted by the fall of base metal prices. During the period of inactivity, the production capacity of the operation was doubled, and additional ore reserves were developed. The newly rebuilt mill will now handle some 30,000 tons of ore per month, and some 3,000 tons of lead, zinc, and copper concentrates will be shipped monthly to the smelters of American Smelting and Refining Company at Leadville, Colorado, Amarillo, and El Paso, Texas. John Wise is general manager of Telluride Mines, a wholly owned subsidiary of Idarado Mining Company.

Rico Argentine Mining Company has encountered four feet of lead-zinc-silver ore at the end of its St. Louis Tunnel in the Rico district of Colorado. This first bed of replacement ore was discovered in drilling several years ago. The extent of the deposit is not known, but the ore is of higher grade than that now being mined. Full-scale mining of this section will begin shortly.

Atlas Uranium Corporation of Moab, Utah has purchased a lead-zinc-silver processing mill and is moving it from California to Colorado where the firm has property in Gunnison County. The mill will have a 100-ton-per-day capacity with provision for expansion if warranted. Atlas also has copper holdings in San Juan County, Utah; oil and gas interests in La Plata County, Colorado; and some uranium properties in southeastern Utah. J. C. Burgess is president.

The joint operations of American Smelting and Refining Company and Resurrection Mining Company have been making steady progress. The Irene shaft in the Leadville district of Colorado, which had been allowed to fill with water in 1953 when low metal prices caused suspension of operations, is be-

ing dewatered, and rehabilitation of the 1600 level (formerly 1700) is underway. A sump room will be cut below the 1750 station (formerly the 1850). When this work is completed, indicated ore bodies between the 1600 and 1700 levels will be developed and stoping will begin. Exploration work to the south will also be undertaken, and this is expected to be completed by early summer.

A St. Louis, Missouri firm plans to reopen the old *Cashin* copper-silver mine in the Paradox Valley of Montrose County, Colorado. The group plans to spend about \$190,000 in developing the mine and building a 200-ton-per-day copper mill on LaSal Creek. Judge Dan H. Hughes of Montrose is trustee for the firm.

Minerals Corporation of America, (Micoa) of Grand Junction, Colorado, has acquired the assets of Airborne Exploration Corporation of Dallas, Texas. This includes radiation detection equipment and two airplanes, one newly equipped with scintillator. Airborne Exploration will act as a wholly owned subsidiary, and its first job will be to explore by air the properties of Micoa, in Utah. The firm will also be available for general exploration work on a contract basis.

SOUTH DAKOTA

Amec Corporation, a mining firm with headquarters at Lead, South Dakota, was recently incorporated at Pierre by James L. Hoffman of Deadwood, Alan J. Patterson of Lead, and Peter C. Lien of Rapid City.

Midwest Lithium Corporation of Rapid City, South Dakota reports that it is remodeling the old U. S. Gypsum Company plant near Piedmont at a cost of about \$100,000. The firm plans to mine ore between Hill City and Custer, and to process it at the Piedmont plant. Presently ore is being shipped to Minnesota and New Jersey for processing. Other ore producers in the area will also be able to ship to the new facility.

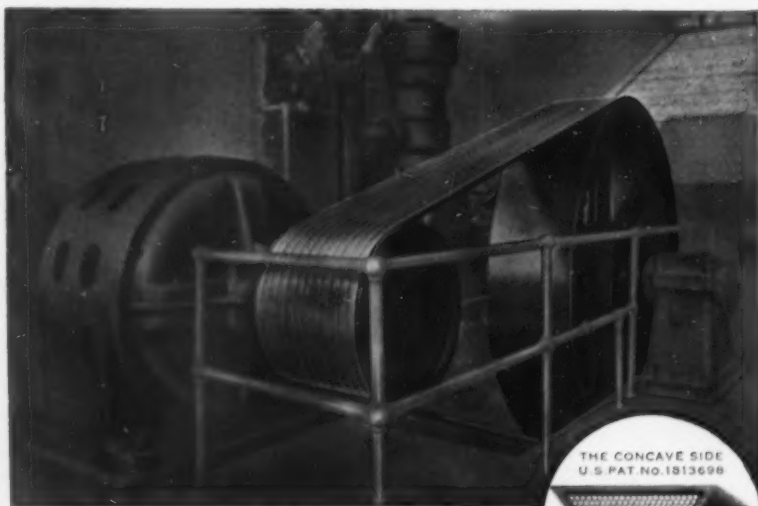
UTAH

Hecla Mining Company of Wallace, Idaho has obtained a DMEA loan for drilling on the Hot Rock claims adjoining the Radon uranium mine in the Big Indian district of San Juan County, Utah. The contract calls for \$81,680 worth of drilling, with the DMEA paying 75 percent of this. The 35 Hot Rock claims are owned by Federal Uranium Corporation; Hecla has an operating agreement for 50 percent of the profits. Federal also owns the Radon mine which Hecla is developing under a contract which provides Hecla with 21.25 percent of net ore returns after it has been reimbursed for development costs. Full production of about 250 tons per day is expected from the Radon this spring.

The American Gilsonite Company is sinking a vertical, 1,000-foot, four-compartment shaft on its Cowboy vein near Bonanza, Uintah County, Utah. Drifts will then be driven eastward starting 50 feet below the surface at 200- to 300-foot vertical intervals. These drifts will be driven uphill at about 2% degrees and

**Cheyenne Strips Wyoming Uranium Property**

In the photograph above, overburden from an open-pit uranium mine is being stripped by a heavy-duty, 3/4-yard, Lorain-26 shovel in preparation for the removal of the ore. The mine, one of the Conant Group, is located 43 miles southeast of Riverton, Wyoming, north of the White Mountains. The machine is working against a 40-foot face composed of sandstone and limestone. The mine is about 1,500 by 900 feet in size and is being worked by the Cheyenne Mining and Uranium Company of Omaha, Nebraska.



Why a V-Belt with

CONCAVE SIDES

wears longer



Fig. 1

It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides fill out on the bend and become straight. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.



Fig. 1-A

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with concave sides—Gates Vulco Rope . . . readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—World's Largest Maker of V-Belts.



Fig. 2



Fig. 2-A

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 68

Gates VULCO ROPE Drives

ROCKY MOUNTAIN

connected by vertical shafts at intervals of 1,000 to 1,500 feet horizontally. These shafts will serve as air and supply entrances. Mining will start from the upper drift and proceed downward to within 10 or 20 feet of the next lower drift. A pillar slightly thicker than the width of the vein will be left over each drift until mining is complete. These pillars may or may not be recoverable. It is presently planned to recover them as they represent about 10 percent of the total ore.

New Park Mining Company and United States Smelting Mining & Refining Company have signed an agreement covering exploration and development of some of U. S. Smelting's property in the Park City district of Utah. The contract provides New Park with an option to buy about 160 acres of patented mining claims adjacent to the New Park mining operations. Under the agreement, New Park will pay U. S. Smelting a sliding scale royalty on any production from the property, said royalties applying to an eventual purchase price estimated at about \$200,000. New Park is currently negotiating with Gulf Minerals Corporation, an affiliate of Gulf Oil Corporation, over a joint exploration program in the Valio area of the Park City district. The work would include a geophysical examination of about 15 sections of land New Park has acquired in the past few years, and an exploration program if seismic and geological data indicate additional work is desirable.

Continental Uranium Inc. has acquired a 90-day option on the rights to mine and mill copper from the Climax No. 1 and No. 2 claims of the Atlas Uranium Corporation in the lower Lisbon Valley, Utah. Atlas leases the claims from Owen Malen of Moab. Atlas has done considerable drilling and ore delineation on the property, and Continental will continue this exploration. If operations warrant, mining would be by stripping, using open pit equipment from Continental's Rattlesnake mine 15 miles away. (See MINING WORLD, pages 48-52, February 1956.) A mill flowsheet is also under consideration. Profits would be shared if the project works out as planned.

Ranger Uranium Exploration and Development Company, Inc. of Vernal, Utah has acquired a lease on two uranium claims on Indian Creek, San Juan County, Utah. An intensified drilling program will begin shortly. Ranger has other uranium properties in four Utah counties, and in Moffat County, Colorado.

Calamity Creek Uranium Corporation of Salt Lake City, Utah has entered into an agreement with Boyles Brothers Drilling Company for the exploration and development of Calamity's property in Utah on a 50-50 basis. Boyles will undertake drilling operations as soon as weather permits, and will pay all costs but has the right to recoup its expenses from ore proceeds. In consideration of this, Calamity will convey an undivided 50 percent of its interest in the claims.

The first shipment of ore has been made from the mine of Moab Uranium Company and Sovereign Uranium Gas & Oil Company in Mineral Canyon west of Moab. The 40-ton pilot shipment was sent to the AEC mill at Monticello, and a shipping quota will be set after the grade of the pilot shipment is determined. The mine will be known as the Matchless. A three-man crew is now stockpiling 15 to 20 tons of ore daily,

ROCKY MOUNTAIN

and a third crew may be added soon to bring daily production to around 50 tons.

Vitro Uranium Corporation plans to truck 6,000 tons of uranium ore monthly from the *Pick* mine to the rail point at Green River, Utah. The ore will then be transported by the Denver & Rio Grande Western Railroad to the Vitro mill at Salt Lake City whose capacity is being increased by 70 percent to accommodate the new ore supply. Vitro, a division of *Vitro Corporation of America*, recently signed an agreement with *Hidden Splendor Mining Company*, *Atlas Corporation* subsidiary, to purchase the total output of the *Pick* mine.

Blue Ridge Gold Mines Company of Reno, Nevada has purchased the *Montezuma* uranium mine in Montezuma Canyon from the *Mountain Valley Company* of Denver, Colorado. The 80-acre property is located 25 miles south of the company's present lease, and 25 miles from the AEC processing plant at Monticello, Utah.

National Farmers Union presently has plans underway to begin mining of its *Cheney* phosphate properties in Rich County, Utah. Possible contractor for the work is *San Francisco Chemical Company*. Also under consideration is construction of a treble superphosphate plant to be located near the mine and on a siding of the Union Pacific Railroad.

Big Horn Uranium Corporation reports the discovery of uranium ore on its *Lost Boy* claims in White Canyon, Utah. The ore was located by *Pioneer Gold Mines*, a subsidiary of *Newcam Company* of Vancouver, British Columbia, while driving a right-of-way tunnel through the claims in order to reach the *Jolly Jack* claims. Big Horn is now extending a tunnel to intersect this ore body.

Sun Uranium Company reportedly has acquired a tungsten property about 85 miles from Salt Lake City, Utah, and is preparing to mine two shifts a day.

The *Cherokee* group of 43 claims on Milk Ranch Mesa, Elk Ridge mining district, 12 miles east of Blanding, Utah, is being worked by *Inspiration Lead Company, Inc.*, Wallace, Idaho. Exploration is being carried on in conjunction with operations at Inspiration's *Bee* group in the Big Indian district, south of Moab, Utah. W. H. Simons is in charge.

A controlling interest in *Blue Goose Mining Inc.* of Farmington, New Mexico has been acquired by J. L. Foutz, president of *Copper Canyon Mining Industries Inc.* which owns the *Monument No. 1* and two other uranium producers in Arizona. Arrangements have also been made for Copper Canyon to drill 15,000 feet of test hole on Blue Goose properties to delineate an ore body indicated by earlier drilling. Copper Canyon will receive Blue Goose stock in payment for the drilling. Blue Goose property is in Garfield County, Utah.

WYOMING

Negotiations for construction of a uranium mill in the Gas Hills or near the buying station at Riverton, both in central Wyoming, are continuing between *Lucky Mc Uranium Corporation* and the

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Utah Construction Company, owners and operators of the Lucky Mc properties in the Gas Hills district, and the United States Atomic Energy Commission. Lucky Mc's metallurgical studies were recently completed by the Battelle Institute of Columbus, Ohio, and the results are being studied by the AEC which is preparing to run its own tests at its pilot plant in Grand Junction, Colorado. If the two companies are successful in mill negotiations, Utah Construction will assume 60 percent stock interest in Lucky Mc Corporation, and will operate the mine; finance, build, and operate the mill; and furnish the working capital.

A body of uranium ore believed worth more than \$500,000 has been blocked out

20 miles northeast of Douglas Wyoming by Little Star Uranium Company. Among the owners is Del Webb, co-owner of the New York Yankees baseball club.

K. C. Heald of Heald Enterprises, Fort Worth, Texas, has paid \$65,000 for an option on 29 uranium claims in the Crooks Gap area of Fremont County, Wyoming. Full agreed price for the claims is \$1,000,000, to be paid in cash and production royalties. An additional 10 percent royalty was retained by the sellers, the Harrower family of Pinedale and Kemmerer, Wyoming. Considerable high-grade ore reportedly has been found near the surface and at a depth of 450 feet in preliminary drilling, both privately and by the United States Atomic

Energy Commission contract drillers. The actual claims involved are 24 Sundog claims belonging to the Split Rock Mining Company, and five Sun claims held by Crooks Gap Mining Company. Both companies are controlled by Bob and Norman Harrower, with 76 percent of the stock held by the Harrower family.

Largest uranium ore shipper . . . and the most consistent . . . in Wyoming has been Vitro Minerals Corporation, which delivered 2,500 tons to the AEC buying station at Riverton, Wyoming from its open-pit operation on John and Gunnel claims in the Gas Hills area in December despite winter weather. Deliveries in January exceeded 3,500 tons. Vitro is now using a second power shovel at its mine.

Following a recent ruling in its favor by the Wyoming Supreme Court, the National Consolidated Mining Company, of Salida, Colorado is preparing to start pilot operations for mining, upgrading, and shipping uranium ore from large holdings on the Red Desert area of the Great Divide Basin in South-Central Wyoming. The firm successfully defended title to 22,540 acres in claims and states leases of the late Mrs. Minnie McCormick, who made original uranium discovery in the area in 1936. The Wyoming Supreme Court ruled that testing work done by the United States Geological Survey helped comply with requirements of annual assessment work. More than \$300,000 was spent by the U.S.G.S. in trenching and other work. Trial shipments have been processed by National Consolidated, with considerable additional equipment to be installed this spring. Regular production is expected by early summer.

The Globe Mining Company of Casper, Wyoming and H. D. Hand, an officer in the firm, have been named defendants in a suit filed in Lander by Green River Oil & Uranium Company of Salt Lake City, over possession of 12 uranium claims in the Gas Hills area of central Wyoming.

The Pumpkin Buttes mining district is planning to appeal to the Wyoming Supreme Court in efforts to enforce compliance with its regulations. A district court avoided a direct ruling on the district's petition that all mining claims located within the district must be recorded with the district recorder.

A blue clay uranium ore being mined in the Gas Hills area of central Wyoming is creating technical problems at the AEC buying station at Riverton. When run through the sampling crusher, the pieces of ore are not crushed, but cake in the crusher.

Charles M. Coleman and the Riverton Uranium Corporation of Chicago and Riverton (Wyoming) have filed suit for \$300,000 against Mountain Mesa Uranium Corporation of Casper and San Juan Uranium Exploration, Inc. of Denver. The suit, filed in federal district court at Cheyenne, charges the defendants with refusing to complete terms and conditions specified in an agreement conveying mining rights to 115 uranium claims in the Gas Hills area to Coleman, who subsequently conveyed them to Riverton Uranium.

Production of gypsum from a newly opened mine near Lander, Wyoming started shortly after the first of the year. More than 1,000,000 tons of gypsum have been blocked out. The mineral will be used to treat alkali soils on Wyoming farms.

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Republic Steel May Buy Half Interest in Ti Plant

The Crane Company and Republic Steel Corporation have been negotiating for the purchase by Republic of one-half of Crane's interest in Cramet, Inc., a producer of titanium sponge.

Cramet is a wholly owned subsidiary of Crane, and operates a plant at Chattanooga, Tennessee. The plant has been in operation since January 1955. It was built with the aid of a \$25,000,000 government loan which is to be repaid out of production. The government is under contract to purchase 6,000 tons of titanium from Cramet over five years.

Republic began commercial production of titanium products in 1952. These include such items as ingot, plate, sheet, strip, and bar shapes.

gether with Lyle Winn and Bill Bee-shears, is drilling on the farm of Marvin Rendleman.

A uranium find near Harrisonville refutes the theory that there is no uranium in Missouri, and two groups of local persons have leased two tracts totaling a little over 1,000 acres. The find was made by Winton Sexton, Harrisonville newspaper man and amateur prospector, in shale outcrops.

There is a reasonable chance that a copper-nickel mine may result from exploratory work in northern Minnesota undertaken by *International Nickel Company*, according to Dr. George W. Schwarz, director of the Minnesota Geological Survey. About 40 diamond drill holes were sunk, some to depths as great as 2,000 feet. Drilling results have not been revealed.

compartment shaft 890 feet deep. It is down over 300 feet already. A second shaft for ventilation, and a truck-service tunnel incline will also be sunk. The company has also started a drilling operation at Goin in Claiborne County where it has leased the old *Straight Creek* zinc mine, abandoned because of water. The property is owned by Lon Yoakum and the Parkey heirs. They are said to be receiving a fee of \$200 per month on a long lease.

The *International Minerals & Chemical Corporation* has added a third shift to its operating schedule at the *Achan* mine at Bartow, Florida. The increased production is said to be necessary because of the increasing demand for phosphate rock.

The *Tungsten Institute* reports that the General Services Administration had purchased 2,379,102 short ton units of tungsten through December 31, 1955. This means that the program was 79.3 percent complete at that time.

A new mining firm, *Rare Earth Corporation*, has been organized in North Carolina with offices at Burnsville. Incorporators are: F. R. Sawyer of Gadsden, Alabama; A. M. Jones of Pittsburgh, Pennsylvania; and Margaret E. Harrelson of Charlotte, North Carolina.

The 10th Annual Meeting of the *American Mining Congress on Surveying and Mapping*, and the 22nd Annual



International Resources Corporation, which has large uranium holdings in Harding County, South Dakota, has opened an office at Bowman, North Dakota. Paul Ayrich, engineer for the firm, has been in the area for months testing for uranium ore. H. L. Hazen, *International Resources* metallurgist, who will have headquarters at Bowman, has been cleared by the A.E.C. to inspect new processes for extracting uranium ore from lignite.

The plant of *Molite Inc.* on the outskirts of Mandan, North Dakota is now operating on a 24-hour schedule producing lightweight aggregate from shale. The shale is strip mined from a hill on which the plant is located and occurs in a layer 75 feet thick, with 40-foot overburden. Reserves are estimated to be sufficient for 10 years of operation.

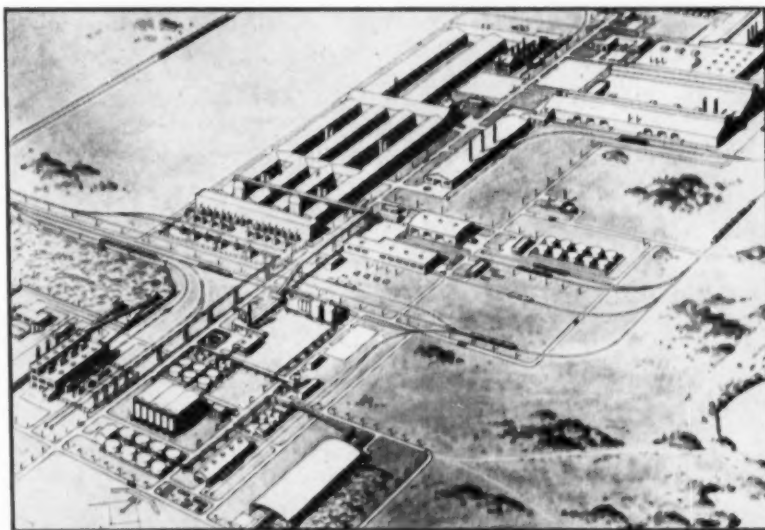
An institute on Lake Superior Geology will be held at the *Michigan College of Mining and Technology* at Houghton, Michigan on May 11 and 12, 1956. Theme of the meeting will be "Geological Exploration"; theoretical and practical developments in techniques of ore search on both sides of the international border will be featured. Geochemical, geophysical, geobotanical, and photogeological approaches in mineral deposits research will be presented by specialists from the United States Geological Survey, the Geological Survey of Canada, the Ontario Department of Mines, and from industry. Field trips will follow the conference. The Michigan Geological Survey and the Exploration Subsection of the Upper Peninsula Section of the American Institute of Mining and Metallurgical Engineers are cooperating with the college in presenting the meetings.

Aridak Uranium Inc. has been incorporated at Bismarck, North Dakota to prospect and develop deposits of uranium and other minerals. Directors include Harry Semerad of Bismarck, H. S. Goodfellow of Minneapolis, Minnesota, and Peter A. Harri of White Bear, Minnesota.

Diamond drilling has been resumed on Hicks Dome, 10 miles north of Elizabethtown, Illinois for uranium and rare earths. Willis Crider of Marion, Kentucky, to-



New Jersey Zinc Company has started shaft sinking operations at its *Flat Gap* property at Treadway, Tennessee. (See *MINING WORLD*, October 1955, page 97.) The hoisting shaft will be a vertical, six-



\$120,000,000 Aluminum Plant for Olin Mathieson

The Olin Mathieson Chemical Corporation will build a \$120,000,000 aluminum plant on the Ohio River near Clarington, Ohio, with production scheduled to begin by mid-1958. The new operation will mark the first time that the aluminum industry has used coal mined directly on the site to provide the larger power requirements for the reduction of alumina to pig aluminum. Investment in the new operation includes approximately \$90,000,000 for the aluminum plant, and \$30,000,000 for the power facilities. The power plant will be engineered and built by the American Gas and Electric Company; it will be built on a new major coal mine which will be constructed, owned, and operated by the Pittsburgh Consolidation Coal Company. Pictured above is an artist's conception of the project. At extreme left is the power plant with the alumina plant immediately to its right; the reduction plant is the long building shown in the upper center, with the rolling mill in the upper right. Not shown is the coal mine and carbonization plant to the left. The alumina plant will have a capacity of 230,000 tons per year. The capacity of the aluminum plant will be 60,000 tons per year. At first, only about 115,000 tons of alumina will be required for the aluminum plant and the other 115,000 tons of surplus alumina will be available to the market. Most of the 60,000 tons of finished aluminum will be consumed by Olin Mathieson. Bauxite the major raw material, will be shipped to the United States from Surinam, where Olin Mathieson has already signed a long-term supply contract. First shipments for stockpiling will begin to arrive early in 1957.

Meeting of the *American Society of Photogrammetry* will be held consecutively on March 18-21 and March 21-24, respectively, at the Shoreham Hotel in Washington, D. C. Among the subjects to be discussed, which may be of interest to mining people, are "How Accurate Is That Map?" by Morris M. Thompson, staff engineer, Photogrammetry, United States Geological Survey; "Economic Aspects of Aerial Exploration" by Norman Vincent of the International Mining and Development Company; "Status of Photogeology in the United States Geological Survey" by Dr. Richard G. Ray of the U.S.G.S.

Illinois Zinc Company is negotiating with the *Hayden Projects, Inc.* about a possible merger of the two groups. Hay-

den Projects, located in New York City, holds licenses for the hydrometallurgical treatment of copper ore and concentrates, and the rolling of non-ferrous metal powders. These processes are said to represent an entirely new technology. *Illinois Zinc* operates rolling mills in Chicago and Peru, Illinois; a zinc concentrating plant at Deming, New Mexico; lead-zinc mines near Silver City, New Mexico; and a copper mine near Douglas, Arizona.

Metal & Thermit Corporation of New York has purchased an 800-acre tract in Virginia and will construct a plant for processing of titanium-bearing ore. The plant, which will be ready this fall, will produce both rutile and ilmenite conventional gravity ore dressing equipment. *Metal & Thermit* formerly operated a

rutile mine at Roseland, Virginia, through a subsidiary company, *American Rutile Corporation*. The present property is located in Hanover County, approximately five miles west of Montpelier.

The *Kennecott Copper Corporation* has taken a purchase option on a large tract of land on River Road in the town of Tonawanda, near Buffalo, New York. *Kennecott* does not have any industrial operations in this vicinity at present, and no plans have been disclosed. There are rumors, however, that the company might be planning a titanium plant.

A sodium hydrosulfite plant is under construction by *Tennessee Copper Company* at Copperhill, Tennessee. Production is expected by the end of this year. The new unit is located between the acid department office and the copper sulphate plant, adjoining the TCC organic chemicals plant. The acid department will operate the new unit.

International Minerals & Chemical Corporation has announced a \$4,000,000 expansion program for its Bonnie chemical plant at Bartow, Florida. When completed, it is expected to produce about 500,000 tons of triple-superphosphate annually.

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Cleveland-Cliffs Iron Company will build a propane gas storage and vapor plant near Negaunee, Michigan. Propane is to be used as the fuel in pelletizing iron ore concentrates from the Humboldt and Republic flotation plants. Both plants are now in operation—Republic was just completed, while the Humboldt had been closed down for two months for repairs.

Pacific Isle Mining Company is engaged in rebuilding the washing plant at the *St. Paul* mine which was formerly operated by the *Republic Steel Corporation*. A crushing and screening plant is being moved from the *Emmett* mine to the *Wacootah*. Both plants are to be completed prior to the start of the 1956 shipping season.

Pickands Mather & Co. will build a complete new mill at the *Mahoning* mine in Hibbing, Minnesota. The plant will consist of crushing, screening, washing, HMS, DSM cyclones, and Humphreys spirals. The plant is scheduled for completion in time for the 1957 shipping season.

Two large iron ore sintering plants for the *National Steel Corporation* will be built by the *Koppers Company*.

Iron ore royalty collections totalled \$4,868,237 in 1955, according to the lands and minerals division of the Minnesota conservation department. Taxes were collected on 7,216,729 tons of ore produced from mines on state property. The division also announces that agreements were completed with *Erie Mining Company* for 30 taconite leases which are expected to yield \$121,696,623. Uranium prospecting permits were issued to 91 persons for radioactive surveys. Some test pits were sunk, but drilling was limited, reports the division.

Newmont Considers U.O. Plant for Washington

Preliminary studies and designs for a \$3,000,000 uranium processing plant in the Spokane, Washington area are being made by Newmont Mining Corporation of New York. The firm is said to be ready to go ahead with construction plans providing ownership and title questions affecting some of the uranium deposits on the Spokane Indian Reservation can be worked out satisfactorily. It is understood that development work within 60 miles of Spokane has proven sufficient uranium ore to support a mill of several hundred tons daily capacity.

Several months ago the Newmont operating subsidiary, Dawn Mining Company, shipped 500-ton samples to the U.S. Atomic Energy Commission at Grand Junction, Colorado to provide data on milling methods and costs. It was determined that the Spokane area uranium ores are amenable to the processes being used in the new mills in the Colorado Plateau area.

The ore tested came from the Midnite open-pit mine on the Spokane Indian Reservation. Dawn Mining did extensive drilling and some tunneling at the property during 1955 under an operating agreement with Midnite Mines, Inc., of Wellpinit, Washington. A total of 94 cars of autunite-gummite-torbernite ore has been shipped from the mine since its discovery in the summer of 1954.

IDAHO

A new silver-lead ore shoot has been discovered in the *Silver Syndicate* mine in the Silver Belt, Coeur d'Alene mining region, Shoshone County, Idaho. It was found in virgin ground in drifting easterly along the Silver Syndicate fault-vein at a depth of 3,700 feet. The structure was reached by a crosscut from adjoining deep workings of *Sunshine Mining Company*. In the first 70 feet, the shoot varied from 3 to 9 feet in width and averaged about 28 ounces of silver and between 7 and 8 percent lead to the ton. Ratio of silver to lead was about 4 to 1, compared with about 1 to 1 in the west end of the structure.

Sinking of a 2,080-foot vertical shaft has been started at the *Silver Mountain Lead Mines* property east of Mullan, Shoshone County, Idaho. Work is on a three-shift basis. The new surface plant includes a 250-horsepower hoist. The project is a joint venture of *Hecla Mining Company* and *Bunker Hill & Sullivan Mining and Concentrating Company*. Hecla is the operating firm. R. W. Neyman is general manager for Hecla.

A lead-silver ore body has been found 725 feet south of the shaft on the new 800-foot level of the *Whitedelf* mine near Clark Fork, Idaho. Downward extension of the South ore body, mined above the 400 level, was anticipated at the 980-foot point. At last report, development ore was being milled in the company's concentrator. Compton I. White Jr. is manager of *Whitedelf Mining and Development Company*.

New Rainbow Mining Company is developing the western part of the *Weber*

mine near Lakeview, Idaho. Instead of reopening the old drift, a new footwall is being driven in firm ground toward ore indicated by old maps. No new ore shoots have been located to the east, says Robert B. Austin, president and manager. Grade of ore in the No. 5 east raise diminished as the ore was mined upward.

Bradley Mining Co. is considering installation of a new electric hoist at the *Ima tungsten* mine in Lemhi County, Idaho.

Stauffer Chemical Company expects to have its \$400,000 phosphate development program near Bear Lake, Idaho completed by the end of this year. *San Francisco Chemical Company* is conducting the work in collaboration with Stauffer's geologists. The work includes a 1,400-foot adit extending at mining depth to the main phosphoria bed, a 3,000-foot drift along the main bed, and a 1,500-foot raise from the adit and drift to the surface elevation above the deposit. The adit has been completed, and the other work is well underway. Reserves in the deposits are estimated at over 5,000,000 tons of commercial grade phosphate rock.

American Smelting and Refining Company's Morning mill at Mullan, Idaho recently started treating ore from a stockpile at the nearby *Lucky Friday Silver-Lead Mines* property. The stockpile currently being milled is the second *Lucky Friday* stockpile to be handled at the Morning mill since the *Colconda* mill which usually concentrates *Lucky Friday* ore has been tied up on strike. The present stockpile, including the tonnage which has already been removed therefrom and milled, and the tonnage still in the stockpile, amounted to approximately 10,000 tons as of January 27.

New Democrat, Inc. has been organized by Vernon W. Butler, Walter Sewell, and Ben Chamberlain of Orofino, Idaho. They have re-staked the *Old Democrat* claims, one of the early placer operations in the state. Activities at present are confined to prospecting and testing. The new operators expect first pro-

duction to be in gold ore, but they also report showings of galena and copper workable from the surface.

D. B. Lewis, president of the *Dr. Ross Dog and Cat Food Company*, reportedly has purchased thorium-bearing property in Idaho and Montana for about \$11,000,000. Sellers were *Idaho Thorium Company, Inc.* and *Salmon Uranium and Thorium Company, Inc.* Present plans call for installation of extensive mining and milling equipment.

Idaho Custer Mines, Inc. has made a public stock offering to finance repairs and improvements to a flotation mill at its central Idaho holdings and for matching federal funds to complete an underground exploration project. Lessees are mining 35 to 40 tons of lead-silver-zinc ore from upper workings.

Big Salmon Uranium, Inc. has signed a contract with the *Lloyd Scott* drill team for additional exploration of its properties located 16 miles east of Riggins, Idaho on the main Salmon River. Exploration thus far has been limited to surface samples and blasting with encouraging results.

MONTANA

Edward Scheitlin has erected a surface plant and is planning on sinking an inclined shaft on a promising manganese outcrop on the *Great Republic* claim located three miles west of Butte, Montana.

Donald Frankel of Los Angeles, California, together with some associates, is developing the *Mooney* uranium mine 17 miles west of Butte, in the Price Gulch district. The work so far has consisted of drifting on the 50-foot level and drilling long holes to locate uranium mineralization.



Old Frontier Test Drills In Washington

Old Frontier Uranium, Inc. has contracted for preliminary test drilling on leased ground in northern Lincoln County, Washington, just south of the Spokane Indian Reservation uranium discoveries. Initial drilling was scheduled in the bottom of three trenches bulldozed to depths of up to 50 feet in gravel. Don Murphy of Eatonville, Washington is president of the firm. Pictured above (left to right) are Ben Lochner, drilling foreman, and Lloyd Thomas, superintendent of the operation.



Several new uranium companies are working in the Roseburg area of Oregon. *Sage Hollow Mining Company*, incorporated by Forrest and Lincoln Kennady, Jim Marier and others, is exploring a group of claims in the Bear Creek area east of Prineville. *Associated Mining & Development Company, Inc.* has been organized by L. E. Hanson, H. V. Golding, and F. H. Walker. They are currently exploring 29 claims near Bear Creek Butte, and expect to start core

drilling soon. A third company in the area is *Metal Service Inc.*



Daybreak Uranium, Inc. has received the maximum initial production bonus of \$35,000. The required 10,000 pounds of uranium oxide were contained in the first 19 railroad cars of ore shipped from the firm's open-pit mine in the Mount Spokane district of Washington. The bonus brought total returns for the first 19 cars to \$79,000, or about \$83.00 a ton.

The company had shipped a total of 73 cars at last report. Kae Sowers, Opportunity, is secretary-treasurer.

A 480-acre tract in the Mount Spokane area of Washington, under lease to *Kit Carson Uranium Company*, is being acquired under purchase contract by *Alpine Mining Company*, *Lexington Silver-Lead Mines*, and *Hunter Silver-Lead Mines*. The purchasers are acquiring Kit Carson stock by carrying on exploration and development work.

Dawn Uranium and Oil Company has started mining autunite on the west slope of Mount Kit Carson in the Mount Spokane area, northern Spokane County, Washington. Twenty test holes have been drilled to depths of 40 to 80 feet. The firm has applied to the U.S. Atomic Energy Commission for a shipping contract. C. R. Echlin of Spokane is secretary-treasurer.

Dahl Uranium Mines, Inc. is diamond drilling nine mineralized zones exposed by surface bulldozing at its *Dahl* lease in the Mount Spokane district. *Corky Smith Drilling Company* is doing the work. Three preliminary holes drilled by Dahl Uranium indicated commercial ore zones at depths of from 23 to 25½ feet and from 76 to 77½ feet. H. J. Tibbits, Spokane is president.

Golden Anchor Mining and Milling Company, which is developing a gold-silver-lead property near Elliston, Montana, has leased six claims nine miles west of Usk, Pend Oreille County, Washington, for uranium exploration. The claim owners, George L. Howard and son, Lloyd, of Spokane, found autunite showings at the surface. Henry L. Newmiller of Elliston, Montana, is company president.

A Canadian drilling contractor, Herbert L. Miller Jr., heads a new Spokane firm, *Inland Empire Mining Company*, which is acquiring uranium leases in the Mount Spokane district of Washington. The firm is capitalized at \$400,000.

Universal Mining Company has been formed by William D. Weaver, Richard Weaver, and Gladys J. McGregor of Spokane. The company hopes to explore 4,700 acres of land north of the Spokane Indian Reservation uranium field in southwestern Stevens County, Washington. It also plans to develop a silver-lead prospect in northern Pend Oreille County and a uranium prospect near Priest Lake in northern Idaho.

American Colloid Company of Chicago has leased a barite-copper prospect six miles northeast of Chewelah, Chewelah mining district, Stevens County, Washington. Gordon LaVigne of Chewelah represented the owners.

Anaconda Uranium Corporation of Washington (no connection with *Anaconda Company* of Butte, Montana) has leased several hundred acres in the Mount Spokane district for exploration purposes. John A. Dunn of Calgary, Canada is president and general manager.

American Leduc Uranium Corporation subsidiary of *American Leduc Petroleum, Ltd.*, New York, has leased several hundred acres in the western foothills of Mount Spokane near the producing *Daybreak Uranium, Inc.*

Martin Stemple of Spokane; James H. Treneman of Newport; and Stanley E. Prichard of Evans, recorded uranium claim locations recently in Pend Oreille and Stevens counties, Washington.

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Terlingua, Texas Mercury District Activity Increasing With New Kilns and Explorations

Despite the attention that uranium exploration is receiving in all parts of the country, including the Terlingua district of Brewster County, Texas, Terlingua continues to be the center of growing mercury production.

Lone Star Mercury, Inc. is expanding its operations on Sections 57 and 44 where preparations are being made to install two additional rotary-type mercury furnaces of 30-ton capacity each. It is reported that the high-grade mercury ore discovered some months ago persists, and a new discovery is also producing a good grade of furnace ore.

Terlingua Mercury Corporation is engaged in both surface and underground diamond drilling on a two-shift basis in addition to exploration by underground mine opening at its Fresno mine. The firm has established a new operating unit at its Campo de los Angeles property where surface trenching across a vertical fracture zone has disclosed a good grade of mercury ore over a width of approximately 20 feet. The structure has been traced across the apex of the anticline to the base on either side, more than 1,000 feet vertically below the crest; but only further work, now in progress, will show the extent of mineralization.

Roy M. Hammond, mining engineer and geologist of the Hammond-Every Engineering Co., Butte, Montana, is employed in a consultant capacity by Terlingua Mercury Corporation. Mr. Hammond has had lengthy experience in the Terlingua quicksilver district. He is now doing geological work for Terlingua Mercury preparatory to the formulation of plans for exploration of Sections 69, 230, 48, 104 and other properties in addition to exploratory and production operations which are now being conducted at the Fresno mine and Campo de los Angeles.

Terlingua Mercury also has entered into an agreement with Motorola Radio Communications Service for the immediate installation of a two-way radio communications system between its Alpine offices, its operating units, and mobile units in the Terlingua quicksilver district. Such a communications system will be invaluable for the speedy and efficient conduct of business despite the 104-mile distance from the mines to Alpine where no other means of communication has previously existed.

The Rainbow Mining Company is reportedly preparing to resume operations under the management of L. C. Bradford, who was employed as furnace superintendent by Terlingua Mercury Corporation during the past year.

Several other concerns are considering beginning mercury operations in the district. Among these are Wright; Clark and Sinkel; Nueces Exploration Corporation; and Mercury Exploration Corporation.

Southern Pacific Geologic Department Busy Mapping

The Southern Pacific Company is making good progress in its geological mapping and mineral evaluation programs of its 24,000,000 acres of land in the western United States. This is mostly so called "railroad section land." In a little over a year a total staff of 14 has been

formed with headquarters in San Francisco, California. Field crew training and mapping have been done on company land near Barstow, California. Field mapping has also been done in the Lovelock, Nevada, and Dunsmuir, California areas. About 250,000 acres have already been examined and mapped on a reconnaissance scale of 1 inch equals 1,000 feet. It has required an average of three geologist man days per square mile (640 acres) for this mapping.

The geologists, one and two-man crews, are equipped with instruments costing \$18,000.00 including scintillometers, gravity meters, electromagnetic equipment, magnetometers, dip needles, and soil sampling equipment. Much emphasis is being given to geochemical prospecting with soil samples taken at regular intervals where deemed advisable. Each geological team prepares a field map and writes a geological report for each land section.

Gold-U.O. Mine Optioned to Minerals Engineering

Minerals Engineering Company of Grand Junction, Colorado has optioned the gold-uranium property of the Atlanta Gold and Uranium Company 30 miles north of Pioche, Nevada. The firm will investigate the possibilities of transform-

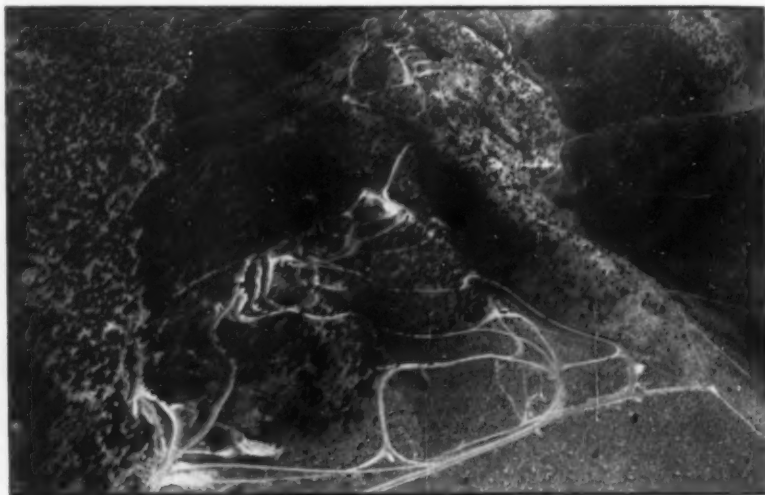
ing an underground operation into an open-pit producer.

According to Blair Burwell, president of Minerals Engineering, assay reports on shipments made to the McGill smelter of Kennecott Copper Corporation, have indicated that there is as much as one pound of uranium in every ton of gold ore. Atlanta Gold and Uranium had been shipping gold ore to Kennecott's smelter for use as flux.



A 500-acre tract near Wickenburg, Arizona reportedly has been leased to the Cerro de Pasco Corporation. The price is said to be \$250,000 and 2½ percent of the net smelter returns. Cerro de Pasco is said to have leased the land from Gregory Kennan of San Antonio, Texas, who, in turn, obtained the land from Mr. and Mrs. N. S. Oberon on an option. The property includes 11 patented claims and 14 unpatented claims, all of 20 acres each, located eight miles northeast of Wickenburg on the Constellation Road.

The Siskon Corporation of Reno, Nevada has placed in escrow approximately \$35,000 as first payments under two options to purchase the Old Reliable copper mine and mill in Pinal County, Arizona for approximately \$160,000. The property is owned by the Copper Creek



Primary Uranium Found at Austin, Nevada

The aerial photograph above shows the uranium district three miles south of Austin, Nevada. The picture was taken looking south and shows the site of the original discovery of uranium (autunite) in the area by Joe and Rudy Rundberg in September 1953. Their original discovery was on the northeastern slope of the mountain in the foreground where a series of benches have since been bulldozed out of the mountain side. Apex Uranium, Inc., which now controls 56 claims in the area including those of the Rundbergs, has announced that coffinite, a primary uranium mineral similar to pitchblende, has been found in its lower No. 1 adit about 160 feet below and some 400 feet westerly from the Rundberg discovery. Country rock is granite and metasediments. Highest grade mineralization has been found along the hanging wall of an aplite dike where the dike is cut by a fault. The adit is portaled near the end of the road in the canyon bottom shown in the lower left hand corner of the picture. Frank A. Chartier of Reno, Nevada is Apex president; William P. Noack, Reno, is director; and Harry H. Hughes of Goldfield is consulting geologist.

SOUTHWEST

Consolidated Mining Company, controlling interest of which is held by Lewis W. Douglas, former United States Ambassador to England. Siskon has a large gold operation on the south fork of Dillon Creek in Siskiyou County, California.

The Indian Service has announced the winning bids for uranium exploration rights on 26 tracts of land on the Navajo Indian Reservation. A total of \$170,946.06 will go to the tribe for the tracts which are located in the Monument Valley area along the Arizona-Utah border and total 13,744 acres. Among the successful bidders were: *Federal Uranium Corporation* of Salt Lake City, *Gibraltar Minerals Company* of Plainville, Texas, *Rare Metals Corporation of America*, Salt Lake City; *New-Shap-Tex Corporation* of Grand Junction, Colorado, *Phillips Petroleum Company* of Bartlesville, Oklahoma, and *Newmont Exploration Ltd.* of Denver.



Verdi Development Company's uranium mill at Rosamond, California is still going through a shakedown period in an effort to secure a recovery consistent with AEC requirements. Steady progress is reported. The firm is also developing the Beauty Mountain tungsten property located in Riverside County. Drilling is presently underway.

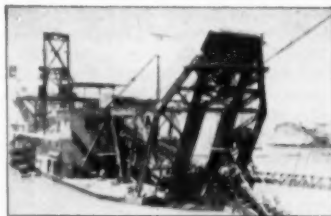
The Riverside County, California Board of Supervisors has granted a permit for an ore reduction plant to Clifford James of Palm Desert and Mike Dunn of Idyllwild. Opponents of the project managed to have some restrictions attached to the permit. They are against industry in the Palm Springs area because they feel it will jeopardize the area as a tourist recreational playground. Most of the proponents of the plant feel that the county's mining potential should be developed.

Algor Development Corporation of Albuquerque, New Mexico has purchased 105 claims near Needles, California from *Mexona Mining Company*, also of Albuquerque. Surface copper mineralization is reported. Uranium also has been found in the slag and dumps. No mining has been done there since 1920, according to Al Ratchner, president of Algor.

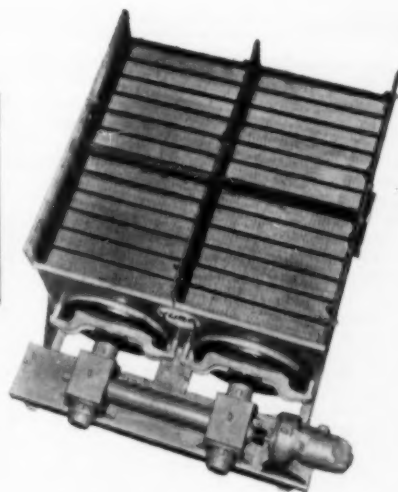


Schroter & Lockwood, consulting mining engineers of Los Angeles, California, have completed a two-month drilling and evaluation program at the old Rio Tinto copper mines at Mountain City, Nevada. The mines were formerly operated by *The Anaconda Company* of Butte, Montana. The drilling has indicated sulphide copper mineralization.

The *Wah Chang Mining Corporation's* Lincoln tungsten mine at Tempiute, Nevada is now on a six-day week, producing 825 tons of ore per day. The mill



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SOUTHWEST

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Magnet Cove Barium Company's new 175-ton barite mill south of Battle Mountain, Nevada is now in operation on a one-shift schedule. As demand for barite increases, company officials plan to increase mill production until it reaches a 24-hour schedule. The company's **Greystone** mine which supplies the mill has been closed since December because heavy snow closed the access road.

Johns-Manville Corporation has optioned a gypsum property in southern Nevada between Las Vegas and Henderson. Called the **Lucky Gypsum** property, it will soon be diamond drilled, trenched, and thoroughly explored to determine the quality and extent of the deposit. Meanwhile, the company's exploration department is examining other gypsum properties in "other parts of the country."

Bruhl Enterprises has suspended operations at the **Argentite** mine near Silver Peak, Nevada, and future plans will not be announced until the return of Avery Brundage, the owner, who is international president of the Olympic organization and currently in Italy for the Winter games. The 200-ton mill will continue to work on a 30-day stockpile before closing down.

Jack Turner and associates have taken a long-term lease on 52 patented claims in the Tonopah district of Esmeralda County, Nevada, and core drilling for uranium is under way. The claims are owned by the Lambertucci brothers, and were the subject of a recent dispute with Franklin Turnham who held a lease on the property.

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The **Anaconda Company** of Butte, Montana is said to be churn drilling the **Dolly Varden** flats in the vicinity of the old **Victoria** mine near Ely, Nevada.

The **Tonopah Exploration and Development Company** has been organized by a group which holds some 3,000 acres in the Seibert seabed area near Tonopah. Associated in the new venture are Nick Brockman; E. M. Abbott of Wichita, Kansas; C. M. Hammons of Sacramento, California; and F. D. Brockman of Mulvane, Kansas. Plans are being made to explore and develop these holdings.

The **Isbell Construction Company** is developing a new open pit for **Manganese, Inc.**, to be known as the **Hydro** pit. Located near the firm's other manganese property in the area around Henderson, Nevada, the stripping program calls for removal of about 30,000 cubic yards of gravel and more than 2,000,000 cubic yards of waste rock. Completion is scheduled for early 1957, but it is expected that mill grade ore in quantity will be available by the spring of this year. An ore round has been drilled, sampled, and about two tons of drill cuttings have been sent to the pilot plant for testing.

NEW MEXICO

The **United States Atomic Energy Commission** will open an ore-buying station of limited capacity near Grants, New Mexico. It will be of the semi-portable type and will go into operation about the first of April. It will serve the area pending construction of new milling facilities. Because of the limited capacity of the temporary quarters, it may be necessary to limit the deliveries from individual producers in order to give as many producers as possible an opportunity to sell ore. In order to plan and schedule deliveries, the Commission will require advance information on ore reserves, the development status of the property, and planned rate of production.

Stockholders of **Frontier Uranium Company** of Gallup, New Mexico have voted to accept a proposal by **Gulf Uranium and Development Company** to purchase all of the assets and liabilities of Frontier. The transfer is now being worked out.

Kerr-McGee Industries Inc. of Oklahoma City, Oklahoma is conducting a drilling program of at least 100,000 feet on property in McKinley County, New Mexico. The uranium-bearing property had been subject of a dispute between **Kerr-McGee** and **United Western Minerals**. An out-of-court agreement provides that **United Western** will receive a 15 percent working interest, and **Kerr-McGee** will be operator of the property. **United Western's** 15 percent is shared with three other firms—**San Jacinto Uranium, Whitecloud and Company**, and **J. H. Whitnew and Company**.

American Metals Company has joined **Sabre Uranium Company** and **Pinon Uranium Company** in development of a large uranium property in northern New Mexico. The \$17,000,000 transaction reportedly will involve the merger of the two uranium firms into one large company in which **American Metals** will have a 25 percent interest. **Sabre** stockholders will receive one share of stock in the new company for every two **Sabre** shares, and

Pinon stockholders will exchange their holdings on a share-for-share basis. In return for the 25 percent interest, **American Metals** will place \$4,500,000 in equity in the new company and later will contribute some \$13,000,000 worth of mill construction and mining equipment. It will also hold a management contract for both mining and milling operations. Plans call for construction of a \$12,000,000 mill near Grant, if AEC approval can be obtained.

Swan-Finch Oil Corporation, drilling under a DMEA contract near Grants, New Mexico, reports it has uncovered a body of uranium ore. The discovery was made in the **Poison Canyon** area on property recently acquired from the **Colamer Corporation**.

The **New Mexico Copper Corporation** has announced that it is modifying its mill at Carrizozo, New Mexico to handle increased amounts of lead, silver, zinc, and copper sulphide ores from its **Water Canyon** and **Bonita** properties in south central New Mexico. A crew is also doing some development work at the company's **Surprise** property in the Gallinas district where several kinds of rare earths are reported to be present.

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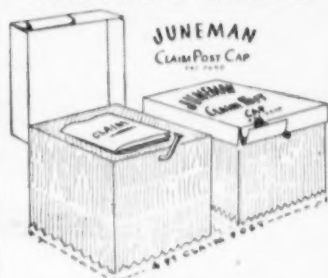
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INDEX OF ADVERTISERS IN MINING WORLD

Agence Minière & Maritime S/A 80	Euclid Div., General Motors	Net'l Tank & Pipe Co. 98
Allis-Chalmers Mfg. Co. 101	Overseas Operations WM 1	New York-Arizona Devel. Corp. 99
Gen. Machy. Div. WM 68	(World Mining Only)	Nordberg Mfg. Co. 14, 15
(World Mining Only)	Fagerlund Fabrikker, A/S 95	Oliver Corp. WM 1
Allis-Chalmers Mfg. Co., Constr. Machy. Div. 17	Federal Pipe & Tank 101	(World Mining Only)
Allison Steel Mfg. Co. 101	Flexible Steel Lacing Co. 73	Osmose Wood Pres. Co. of Amer. Inc. 90
Alloy Steel & Metals Co. 70	Gallagher Co. 27	Pacific Foundry Co., Ltd. 83
Amer. Brattice Cloth Co. 70	Gardner-Denver Co. 5	Peale, Rodgers 99
Amer. Cyanamid Co. 33	Gates Rubber Co. 88	Perry Equip. Corp. 100
Amer. Smelting & Refining Co. 68	Godoy & Co., Inc., E. A. 73	Quaker Rubber Div., H. K. Porter Company, Inc. 28
Amer. Zinc Lead & Smelting Co. 56	Goodall Bros. 99	Radcliff Co., Inc. 78
Arizona Testing Laboratories 99	Goodman Mfg. Co. WM 64	Roy Drilling Co., Inc. 99
Atlas Diesel Co. WM 77	(World Mining Only)	Resisto-Loy Co. 68
(World Mining Only)	Hanks, Inc., Abbot A. 99	Riblet Tramway 78
Boulton, Philip J. 99	Hardinge Co. 76	Salem Tool Co. 81
Bench, Ray M. 101	Hawley & Hawley 99	Sanford Day Iron Works 92
Black & Decker 99	Hawthorne, Inc., Herb J. WM 81	Shoemaker, A. G. 20
Boyles Bros. Drilling Co. 32	(World Mining Only)	Simplex Wire & Cable Co. 20
Buda Div., A. C. Mfg. Co. 21	Horseshoe Canyon Uranium, Inc. 98	Smarchanski, Mark G. 80
Bunker Hill & Sullivan Mng. & Con. 56	Houston Tool Co. 79	Smit & Co., Inc., Anton Smith-Emery Co. 99
Business Men's Clearing House 98	Int. Smelting & Refining Co. 56	Smith, Paul F. 99
C M G Industries 101	Isbell Construction Co. 81	Standard Oil Co. of Calif. 22
C S Card Iron Works 67	Johnson, Herbert B. 99	Standard Steel Corp. 25
Carpa Mfg. Co. 8	Jones, Philip L. 99	Still, Arthur R. 62
Caterpillar Tractor Co. 2, 64, 77	Joy Mfg. Co. 12, 95	Stout, William R. 100
Christensen Diamond Prod. Co. 69	Juneman Claim Post Cap 101	Syntron Co. 94
Clark Equip. Int'l, C. A. WM 16	Keegle, C. P. 99	Thomas Flexible Coupling Co. 80
(World Mining Only)	Keehring Overseas Co. WM 74	Timken Roller Bearing Co. 16
Coal Mine Equip. Sales Co. 100	(World Mining Only)	Trylor Eng. & Mfg. Co. 23
Coast Manufacturing Co. 32	Lake Shore Eng. Co. 30, 51	Udy, Martin J. 99
Colo. Assaying Co. 99	Ledoux & Co. 99	Union Oil Co. 19
Colo. Fuel & Iron Corp. 18	Le Rol Div., Westinghouse Air Brake Co. 60	U. S. Steel Corp. 26
Colo. Iron Works, Sub. of Mine, Smelter Supply Co. 8	Le Rol Export Sales, Le Tournau-Westinghouse Co. WM 40	Universal Eng. Co. 75
Columbian Steel Tank Co. 83	(World Mining Only)	Wedge Wire Corp. 3
Cowin & Co., Inc. 99	Le Tournau-Westinghouse Co. 9, 11, 13	Western Machy Co. Inside Front Cover
Darien Corp. 100	Longyear Co., E. J. Inside Back Cover	Western Rock Bit Mfg. Co. 58
Deggendorfer, T. G. 99	Magma Copper Co. 56	Wheel Trussing Tool Co. 24
Deteler Concentrator Co. 73	Melanson Eng. Inc., John F. 80	Wild Heerbrugg Instruments Inc. 99
Denver Equip. Co. 34	Merrick Scale Mfg., Co. 95	Willifay & Sons, Inc., A. R. Outside Back Cover
Diamond Drill Cont. Co. 92	Miller, Arthur H. 99	Wilson, Glenn B. 101
Dickinson Laboratories 99	Mine & Smelter Supply Co. 81	Wisser & Cox 99
Dorr-Oliver, Inc. 66	Moab Drilling Co. 99	Wolf, Harry J. 99
Earle, N. K. 99	Mobile Drilling, Inc. 74	Wood, Assaying Co. 99
Emco, Corp. 7, 10, 72, Outside Front Cover	Moroso Bros. Machy. Co. 100	Yuba Mfg. Co. 97
(World Mining Only)	Mott & Sons, Inc., B. H. 99	
Electric Steel Foundry Co. 4	Murphy, F. M. 99	
Engineers Syndicate, Inc. 98		
Euclid Div., General Motors Corp. 1		

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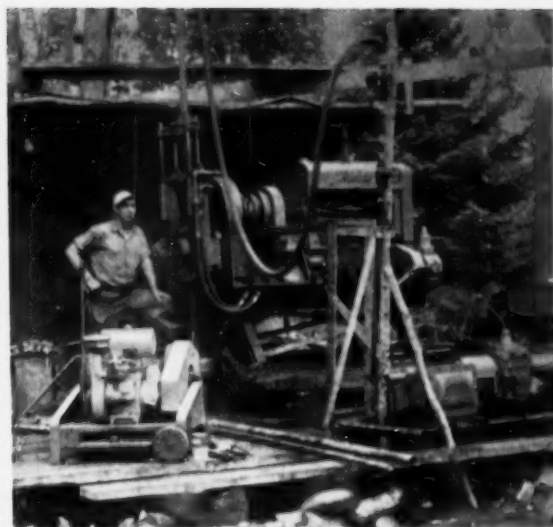
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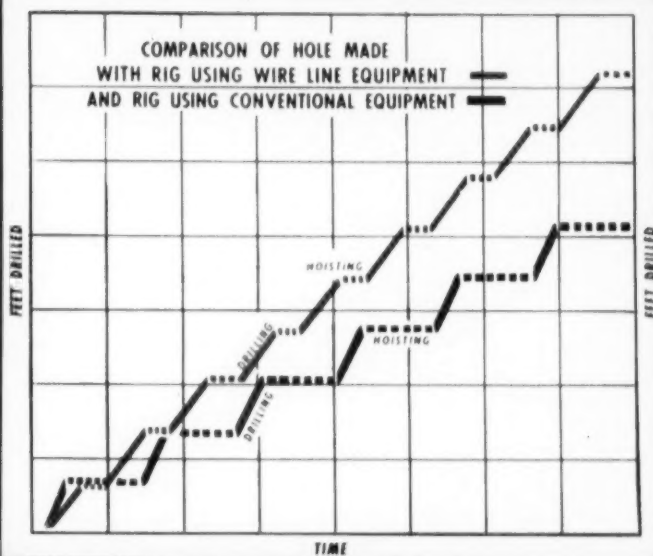
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